



**AN ASSESSMENT OF FORCE PROTECTION KNOWLEDGE IN
AIR FORCE CIVIL ENGINEER OFFICERS**

THESIS

Dustin C. Richards, First Lieutenant, USAF
AFIT/GEM/ENV/05M-10

**DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY**

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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ENGINEER OFFICERS

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Dustin C. Richards, BS

First Lieutenant, USAF

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Dustin C. Richards, BS
First Lieutenant, USAF

Approved:

/signed/

Alfred E. Thal, Jr., Ph.D. (Chairman)

16 March 2005
date

/signed/

Kent C. Halverson, Major, USAF (Member)

16 March 2005
date

/signed/

Jonathan L. Gray, Captain, USAF (Member)

15 March 2005
date

Abstract

The purpose of this research was to assess force protection knowledge in Air Force civil engineer officers. Specifically, the research attempted to answer four specific research questions dealing with officers' understanding of force protection concepts and principles, effectiveness of current training, which training is effective and which needs improvement, and how officers feel about the training they receive and their ability to apply it to real world situations. The research consisted of 542 civil engineer officers taking a knowledge based survey that tested their force protection knowledge.

The results indicated that there was no statistically significant difference in force protection knowledge between officers who attended formal career field training and those who did not attend. However, the results indicated that two training courses did have significant positive influence on force protection knowledge for mid-level officer ranks. These results suggest that existing Air Force civil engineer training courses do not adequately teach force protection concepts.

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Dustin C. Richards

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AN ASSESSMENT OF FORCE PROTECTION KNOWLEDGE
IN AIR FORCE CIVIL ENGINEER OFFICERS

I. INTRODUCTION

In 1996, the Khobar Towers housing complex near Dhahran, Saudi Arabia, was being used to house Saudi and foreign military personnel, with the buildings in the northern half of the complex being occupied primarily by the United States. In the late evening hours of June 25th, 1996, a group of men parked a fuel truck in a public parking lot adjacent to the security fence on the north side of the complex. When the men exited the vehicle and fled quickly in a waiting car, security forces became suspicious and ordered an immediate evacuation of the nearby building. Although the residents of the building moved quickly, the evacuation was not completed in time. In a matter of minutes, an explosion rocked the night air -- 19 Airmen were killed with hundreds more suffering various injuries (Downing Assessment Task Force, 1996:viii).

Background

The 1996 Khobar Towers bombing was certainly not the first terrorist attack on American forces in foreign lands. However, it was a strong reminder that American troops on foreign soil are under a constant threat of attack from a nearly invisible enemy. This fact was reinforced with the 1998 car bomb attacks on U.S. Embassies in Kenya (252 dead and over 5,000 wounded) and Tanzania (10 dead and over 70 wounded).

Terrorists struck again in the October 2000 bombing of the USS Cole off the coast of Yemen.

These terrorist attacks are a reminder that the security and safety of American citizens continue to require increasingly amounts of resources. Terrorism by definition is the calculated use of violence against civilians in order to attain goals that are political, religious, or ideological in nature. Because recent attacks in foreign lands have been against both military and civilian personnel, the line between terrorism and insurgent actions is blurry. For instance, as of March 2005, the death toll in Iraq is over 1,600 persons. Many of these deaths occurred from insurgent attacks and not direct combat. Insurgent groups understand that they cannot match the United States in either resources or technology. This is one reason they resort to roadside bombs, vehicle bombs, suicide bombers, and other Improvised Explosive Devices (IEDs) to cause casualties. Therefore, this research will focus on the daily risk American servicemen face on the ground in foreign lands.

A critical question centers around methods American forces can use to protect themselves against these attacks using available resources while ensuring mission completion. One answer to this question lies in the hands of the engineers employed by the various services to build and maintain their expeditionary bases and camps. These engineers are also responsible for designing measures to protect troops from terrorist attack. These measures are but one facet of the overarching strategy for force protection. Other measures include the activities of security forces to secure installations and the efforts of the intelligence community to uncover enemy plots before they are executed.

Force Protection

Force protection is a simple concept that becomes complicated when employed. On the surface, it is very straightforward: protect the forces employed by the United States government to accomplish various tasks. In reality, it is an all encompassing strategy that requires coordination between many different career fields. In fact, the Department of Defense defines force protection as,

"... the security program designed to protect soldiers, civilian employees, family members, facilities, and equipment, in all locations and situations, accomplished through planned and integrated application of combating terrorism (antiterrorism and counterterrorism), physical security, operations security, personal protective services, and supported by intelligence, counterintelligence, and other security programs." (Murrey, 2000:1)

Therefore, the Air Force decided to bring each organization with a stake in force protection together to form the Force Protection Working Group (FPWG) in 1995. This group exists at every forward operating Air Force base and falls directly under the authority of the wing commander. It is managed by the installation force protection officer and consists of representatives from security forces, civil engineering, intelligence, Office of Special Investigation (OSI), services, and any other base organization that has an interest in force protection (Department of the Air Force, 2004:23). This research focuses on the role of Air Force Civil Engineers regarding force protection responsibilities.

Air Force Civil Engineers

As part of the FPWG, Air Force Civil Engineers take the lead on designing protective measures against various kinds of explosive attack, as well as ensuring base

facilities are hardened against the threat of enemy attack. This threat includes attack by direct fire weapons such as rocket propelled grenades and small arms, as well as indirect fire weapons such as mortars and other artillery. Air Force engineers design against these threats using guidance from the Air Force Civil Engineer Support Agency (AFCESA), the Air Force Center for Environmental Excellence (AFCEE), the Force Protection Battlelab, and the US Army Corps of Engineers (CoE).

Air Force civil engineers' role in force protection is relatively new. The responsibilities of officers in a contingency environment varies widely depending on the situation, but it has traditionally consisted of managing facility design and construction efforts, environmental programs, base planning, and maintenance and repair of the infrastructure and facilities. As FPWGs have gained prominence at bases around the world, civil engineers have seen their role in force protection increase -- from a voice in planning meetings, to a provider of indispensable knowledge regarding design principles and concepts.

Problem Statement and Research Questions

As casualties of insurgent attacks mount in Iraq and Afghanistan, planning measures to protect against and mitigate terrorist attacks have become integral pieces of every operation. This renewed emphasis on troop safety is a significant improvement. However, a potential problem may exist since the total number of Air Force (AF) civil engineer personnel with the required training to design critical force protection measures is only a fraction of the total AF civil engineer officer corps (Bouffard, 2004:12). In addition, there is a concern regarding how much of their valuable training is retained.

To address this concern, this research will measure the knowledge of force protection principles and concepts among AF civil engineer officers. It will also attempt to correlate this knowledge with the level of force protection (FP) training to evaluate the effectiveness of FP training. To assess the level of force protection knowledge in civil engineers, two important factors in force protection were studied: blast mitigation and site layout. The specific research questions are listed below.

1. Do Air Force civil engineer officers understand the principles and concepts of force protection in a deployed environment?
2. Is current training effective at instilling force protection knowledge in Air Force civil engineer officers?
3. Which training is most effective at teaching FP, and which needs improvement?
4. How do Air Force civil engineer officers feel about the training they receive and their readiness to apply it to real world situations?

The answers to each of these questions will provide insight into the current force protection knowledge level of officers in the Air Force civil engineer career field. This

information will be helpful to leadership in determining possible changes and updates to coursework and training classes.

Methodology

In order to study these research questions, a web-based survey was developed using inputs from experts in force protection. The survey was pilot tested and validated before being administered to the Air Force civil engineer career field. After data was collected, analysis of variance (ANOVA) and linear multivariate regression methods were used to analyze the data and elicit meaningful results. In addition, empirical comments provided by the survey respondents were analyzed.

Scope and Assumptions

The scope of this research is an attempt to gather exploratory data about the state of Air Force civil engineer force protection knowledge. There is no current research on this topic reported in the literature. Hopefully, this study will serve as a stepping stone to future research that may yield conclusive results that can be used by decision makers to improve the protection of forces in the field. Some limiting factors for the study were a lack of existing measures for testing force protection knowledge, lack of information on training course content, and a dearth of research on the general topic.

There were a few key assumptions made in the course of this research. One such assumption was that each survey respondent would make an honest effort to complete the survey without outside help or influences. Another assumption was that each respondent would only complete the survey one time. One of the most important assumptions made

was that the total score of each respondent was an indicator of the overall force protection knowledge of that individual. Since this survey instrument has never been used before, it is difficult to ensure this is true.

II. LITERATURE REVIEW

This chapter examines current literature relevant to the role of Air Force civil engineers in designing force protection (FP) measures, which include two factors: blast mitigation and site layout and design. The chapter begins with an overview of terrorism with an emphasis on the increasing occurrence of asymmetric attacks by insurgents. This is followed by a brief history of civil engineers in the Air Force and their traditional role in force protection. Finally, the training foundation for force protection knowledge in the civil engineering career field will be outlined. This will include official documents and guidance pertaining to force protection.

The Rise of Insurgent Attacks

Terrorism has existed in one form or another for thousands of years. Over that time, it has been embraced by a variety of groups. These groups include religious sects such as Jews and Muslims who murdered people who refused to accept their faith, political groups in places like Northern Ireland and Spain, and even governmental groups such as Nazi Germany and Stalinist Russia (Burgess, 2003).

In the last twenty years, terror in the name of religion has re-emerged as a threat to people around the world. Much of the conflict in this area is based in the Middle East, where the Israel-Palestinian problem continues to fester and Islamic extremist groups grow more influential. Groups like Al-Qaeda have declared religious war on the United

States and seek to murder American citizens at home or abroad with every chance they get (Terrorism in 20th Century, 2002).

After the events of September 11, 2001, the United States declared a “Global War on Terrorism,” effectively promising to seek out groups such as Al-Qaeda wherever they lived, trained, or hid, and destroy them. This declaration of war led to the invasions of Afghanistan and Iraq. It also led indirectly to the thousands of insurgent attacks against coalition forces in Iraq since the start of Operation Iraqi Freedom. There is not a day that goes by on the ground in Iraq that is not marred by an insurgent attack against coalition forces (Chandrasekaran, 2004).

Air Force Civil Engineers

The purpose of this section is twofold. First, a brief history of Air Force civil Engineers is provided to familiarize the reader with their purpose. This is followed by a discussion of their traditional role in force protection measures.

Civil Engineers – Early Army Years

Air Force civil Engineers are keepers of a legacy that pre-dates World War I. During World War I, engineers made up a small part of the Army Signal Corps, which became the Army Air Service towards the end of the war. The Army Air Service was renamed the American Air Service in 1918 and was given responsibility for construction projects. This organization, which became the Army Air Corps in 1926, continued to grow and expand; in 1940, responsibility for Army Air Corps facilities in the continental United States was transferred to the Army Corps of Engineers (CoE). For overseas

construction, however, the need for a force capable of constructing and maintaining airfields remained. Thus, the Aviation Engineers were born (Department of the Air Force, 1995:7).

The Aviation Engineers were a vital part of the Army Air Forces, which was established in 1941 as an outgrowth of the Army Air Corps. The Aviation Engineers communicated with the Army in technical terms, were soldiers before engineers, and understood Army needs firsthand. They were trained and equipped to construct airfields anywhere, anytime. In addition, these new units were prepared to improve and maintain existing facilities, as well as repair battle-damaged airfields. Furthermore, the Aviation Engineers were trained to camouflage and conceal airfields as well as build defenses against enemy attack. Finally, these remarkable units employed riflemen and machine gunners to enable them to take an active role in the defense of the airfields. The Aviation Engineers were the perfect combat engineers for the Army Air Forces: troops that were capable of constructing, maintaining, concealing, and defending airfields anywhere in the world (Department of the Air Force, 1995:7).

Upon American entry into World War II, the Aviation Engineers got the opportunity to find out if their extensive training was worth it. They were deployed overseas and saw action throughout Europe and the Pacific. Tasked above and beyond their charter, they were asked to build roads and revetments in addition to airfields. The places they traveled to carry out their tasks included North Africa, Italy, Normandy, Austria, and Czechoslovakia, not to mention islands in the Pacific such as the Philippines.

Civil Engineers – Air Force Years

The Air Force became a separate service in 1947, but the Army Corps of Engineers retained control of all combat construction requirements. This relationship caused problems during the Korean War, when Special Category Army with the Air Force (SCARWAF) troops had responsibility for constructing, upgrading, expanding, and rehabilitating airfields. The issue with these troops is that they were funded and manned by the Air Force but organized, equipped, and trained by the Army (Contingency and Disaster Planning, 1995:18).

After the Korean War, in an attempt to bring combat engineering into its control, the Air Force asked to stand up its own organic engineering capability, apart from the Army. This request was denied by the Secretary of Defense, who left the combat engineering field of expertise in the Army's purview and completely eliminated the SCARWAF troops. This left the Air Force with no combat engineering capability, a state in which they would remain until the mid-1960s (Contingency and Disaster Planning, 1995:21).

The turbulent times of the early 1960s, with the Berlin crisis in 1961 and the Cuban missile crisis of 1962 combining with rising involvement in Southeast Asia, led to the establishment of an Air Force engineering capability. This concept, developed in 1964 and called the Prime Base Engineer Emergency Force (BEEF), led to Air Force engineers being deployed to Vietnam to erect revetments, construct barracks, perform infrastructure maintenance, and accomplish other beddown tasks (Air Force Civil Engineer Contingency Concept of Operations, 1997:8). In addition to the Prime BEEF teams being deployed to Southeast Asia, the need was seen for a heavy construction and

repair capability beyond that provided by Prime BEEF forces. Thus was born the Rapid Engineer Deployable Heavy Operational Repair Squadron, Engineering (RED HORSE), units that could deploy anywhere in the world with their own equipment and supplies (Contingency and Disaster Planning, 1995:24).

The decades of the 70s and 80s were relatively peaceful times, yet Air Force engineers stayed busy. Prime BEEF teams and RED HORSE units were deployed in support of natural disasters around the world, as well as to various Air Force bases to work on projects to improve quality of life. As the 1990s dawned, Air Force civil engineers were suddenly thrust into the role of bedding down 55,000 troops and 1,200 aircraft at almost 30 sites in support of Operations Desert Shield and Storm. In addition, they erected 5,000 tents and constructed nearly 300,000 square feet of buildings (Contingency and Disaster Planning, 1995:31). Today, Air Force civil engineers represent a highly skilled force providing invaluable support for troops on the ground around the world, but especially those in Afghanistan and Iraq, fighting in the Global War on Terrorism.

Civil Engineers – Force Protection Responsibilities

It has already been stated that force protection is a comprehensive effort between many organizations. The civil engineers play an important part in this comprehensive effort. It is the responsibility of the Base civil Engineer (BCE) to ensure that facility force protection measures are included in the Installation Security Plan. The BCE is also charged with integrating force protection measures into the installation's General Plan, Area Development Plan, and Facility Designs. The facility designers fall under the BCE

and are an important cog in the force protection machine; they are responsible for ensuring force protection measures are incorporated into the design process. These engineers, planners, and project managers work closely with Security Forces and Intelligence to determine threat levels and the best way to counter the perceived threat (Installation Force Protection Guide, undated:6).

Background of Force Protection Training

Before discussing the methods used by Air Force civil engineers to design force protection measures and the training they are given to accomplish these tasks, it makes sense to look at the practices of other governmental organizations in the force protection arena. For the specific topic of force protection in contingency environments, the Army's training programs were reviewed.

Army Force Protection Training

The Army, through its Corps of Engineers, teaches a Security Engineering course that deals specifically with designing facilities with to protect assets and personnel. The foundation of this course is the Unified Facility Criteria (UFC) documents: Department of Defense (DoD) Minimum Antiterrorism Standards for Buildings (UFC 4-010-01), Security Engineering Planning Manual (UFC 4-020-01), and Security Engineering Design Manual (UFC 4-020-02). These UFC documents are an updated and expanded version of the technical manuals on Security Engineering used by the Army and Air Force which were published in 1994 (Security Engineering Course Synopsis, 2005).

The course covers design criteria for a facility, which includes deciding which assets to protect, the threat to those assets, the degree of protection against the threat, and design constraints imposed by the user. In addition, students taking the course learn how to integrate protective measures into a complete system. The course also includes cost estimation for force protection measures, as well as methods of incorporating risk analysis and regulatory requirements for physical security and force protection into facility planning (Security Engineering Course Synopsis, 2005). The directors of the course are constantly improving the content, having proposed additional classes on Anti-Terrorism Standards, Master Planning for Anti-Terrorism, Blast Resistant Window Design, Progressive Collapse, Blast Resistant Structure Design, Access Control Point Design, and Vulnerability Assessments (Proposed Curriculum, 2005).

Training classes are not the only methods the Army uses to impart FP knowledge to its engineers. Various documents and computer software are utilized by designers to ensure facilities are ready for the specified threat. These include the New Barracks Construction Criteria, an update over previous design standards that includes considerations for force protection, and the Security Design for New Civil Works Projects, which begins to set Army-wide regulations and standards regarding new non-facility projects such as bridges and harbor projects (Basham, 2004a:1).

Software programs currently available as design aids from the Army include the Single degree of freedom Blast Effects Design Spreadsheet (SBEDS), which allows users to design structures to resist air blast resulting from explosive attack (Basham, 2004b:1). Department of Defense DoD users can also access the Window Fragment Hazard Level

Analysis (HAZL) program, which can calculate the response of glazing to different blast loadings and model the trajectory of debris from an explosion (Basham, 2004c:1).

Air Force Force Protection Training

At present, the Air Force civil engineer officers receive no dedicated force protection training. Instead, they are provided general overviews of force protection principles in the course of career field training.

Training for Air Force civil engineer officers can be broken down into two categories: mandatory training required based on an individual's rank, and unit-level training accomplished when the unit has time and resources to utilize for training. Current mandatory Air Force training involves two classes taught at the Air Force Institute of Technology Civil Engineer and Services School: Introduction to Base Civil Engineer Organization (MGT 101), and Contingency Engineer Command Course (MGT 585). MGT 101 is considered mandatory training for civil engineer officers when they first enter the career field and contains two hours of broad classroom-based force protection training (CESS, 2005a). MGT 585 is aimed at senior captains with at least eight years of commissioned service and offers an hour and a half of classroom instruction on force protection from a managerial perspective (CESS, 2005b).

Unit-level force protection training accomplished by civil engineer officers includes four avenues: home station training, Silver Flag training, Combat Skills Training, and the Army's Security Engineering Course mentioned above. Home station training varies across squadrons and was not studied in this research. Silver Flag training is accomplished over the course of one week in a team environment at one of three world

wide sites: Tyndall AFB, Florida, Ramstein AB, Germany, and Kadena AB, Japan. The force protection aspect of this training is a one and a half hour briefing about designing force protection measures. This briefing covers available references on force protection and the five planning steps used in designing force protection measures. Students also get a chance for some hands-on training, something that does not occur at the Army Security Engineering Course (Silver Flag Mission Brief, 2005).

Combat Skills Training is a brand new course required for all Air Force personnel deploying to high threat areas of the world. In this course, trainees learn basic weapon skills, convoy tactics, basic medical technician skills, and communication skills. The course is billed as a force protection course, but it does not address the facility and site planning and design principles with which this research is concerned (Bouffard, 2004:12).

Force Protection Literature

Although there is a lack of research focusing on force protection knowledge, there is an extensive body of documentation that provides guidance. Some of the documents the Air Force takes its guidance from include Air Force Doctrine Document (AFDD) 2-4.1, Force Protection; Installation Force Protection Guide (IFPG); Vehicle Bomb Mitigation Guide (VBMG); DoD Minimum Antiterrorism Standards for Buildings (UFC 4-010-01 and UFC 4-010-02); and Air Force Handbook (AFH) 10-222, Volume 3, Guide to Civil Engineer Force Protection. Each of these documents, as they relate to force protection, are described in more detail in the following sections.

Air Force Doctrine Document 2-4.1

Air Force Doctrine Document (AFDD) 2-4.1 was issued in response to the increasing frequency of terrorist attacks on U.S. forces and the attacks of September 11th, 2001. It highlights the constantly changing methods of attack used by our enemies and reinforces the need to think in nontraditional ways in order to stay one step ahead of those enemies.

The document begins with an overview of force protection, which includes a definition of force protection and an explanation of the force protection fundamentals. The overview also covers risk assessments, countermeasures, and the importance of awareness. Next is a breakdown of organizational structure for FP, including the command responsibilities and FP command relationships in a joint environment. A discussion of force protection threats and countering those threats comes next. Countering the threats is broken down into two areas: the risk management process and force protection countermeasure planning. The document concludes with the concept of integrated base defense and the roles for each unit.

Installation Force Protection Guide

The Air Force Center for Environmental Excellence (AFCEE) is the agency responsible for drafting and maintaining of the Installation Force Protection Guide, which covers the aspects of protecting an Air Force base from various threats. Intended solely for Air Force use, the IFPG covers the roles and responsibilities of organizations that have an active role in force protection. These entities include the Air Staff, Security

Forces Center, AFCESA, AFCEE, Office of Special Investigations (OSI), major commands, and the BCE. The IFPG covers in-depth the stages of force protection plan development and the importance of comprehensive planning. It also gives details on both facility site design and building systems design. These tools are invaluable in the hands of project managers and designers in the Civil Engineer squadron.

Vehicle Bomb Mitigation Guide

The Vehicle Bomb Mitigation Guide (VBMG) is published by the Force Protection Battlelab. It is intended for the specific purpose of minimizing damage associated with the threat of vehicle bomb attack. The VBMG focuses on the effects of explosive attack on various home station and expedient types of facilities and contains in-depth coverage of methods for mitigating these threats. It covers various barrier types and the proper method of placing them to best avert disaster. Finally, it offers charts on the required standoff distances when faced with specific explosive threats.

Unified Facilities Criteria 4-010-01 and 02

UFC 4-010-01 contains the DoD Minimum Antiterrorism Standards for Buildings. It is a joint effort between the Army CoE, the Naval Facilities Engineering Command, and the Air Force Civil Engineer. The goal of the UFC is to minimize the likelihood of mass casualties from terrorist attacks. It covers the philosophy, design strategies, and assumptions required to build and maintain facilities on any military

installation. UFC 4-010-02 is the same document as 4-010-01, but is For Official Use Only because it contains the explosive weights used for design.

Air Force Handbook 10-222 Vol 3

AFH 10-222 Vol 3 – Guide to Civil Engineer Force Protection, is published by AFCEA and was last updated in 1997. It is intended for use by civil engineers in a field environment, when they may not have the resources for more in-depth information. The handbook summarizes basic planning concepts and considerations for engineers in support of force protection. In addition, it covers possible terrorist threats to Air Force assets and discusses possible protective measures that may be taken to reduce damage and losses from terrorist acts.

III. METHODOLOGY

This chapter describes the methodology used in this research. It outlines the process used to develop the measurement tool; specifically, it details each step in the development process for a web-based survey and explains how the survey was validated and distributed. The chapter also discusses the statistical techniques, analysis of variance (ANOVA) and linear multivariate regression, used to analyze the survey results.

Web-Based Surveys

An excellent method to gather information about broad questions is through the use of web-based surveys. Some of the advantages of web-based surveys include: distribution to a large number of people at the touch of a button via an e-mail link, easy construction and editing, and automatic exporting of data to analysis tools instead of manual inputting. These positive factors outweigh the few negatives, which include people taking the test more than once, the possibility of network outages or other computer malfunctions that could lead to incomplete submissions, and the inability to stress the importance of the survey face-to-face with respondents.

Developing the Survey

The first step in developing the survey was deciding what type of instrument to use. The two varieties that immediately came to the forefront were ones based on attitudinal measures or performance measures. Attitudinal measures focus on how a

person feels about the questions at hand. For example, if this research used an attitudinal instrument, respondents would be asked how they felt about their force protection knowledge, how good they thought their training was, and whether they thought various changes to the training would be helpful or not. On the other hand, performance measures attempt to assess the knowledge level of a respondent by asking questions with correct and incorrect answers. This method forces the respondent to apply previous training or experience. Since there are right and wrong answers, this method yields a more accurate representation of knowledge. With an attitudinal instrument, a person's impression of personal knowledge may be at odds with actual knowledge. Based on this comparison of the two types of measurement techniques, the performance-based (also known as knowledge-based) instrument was utilized for collecting primary data, although attitudinal questions were asked as well in order to gather secondary data. After determining the type of survey, the content of the survey needed to be determined. This required the development of valid survey items covering the spectrum of desired force protection principles.

Initially, force protection experts who administer training were contacted to obtain testing instruments. These experts were from the following agencies: the Air Force Civil Engineer Support Agency, the Air Force Force Protection Battlelab, the Civil Engineer and Services School, the Army Corps of Engineers Protective Design Center. Initially, the goal was to utilize existing test problems and questions to build an overarching instrument. Unfortunately, the Civil Engineer and Services School had a very small test bank of questions related to force protection. In addition, the Army Corps of Engineers, which offers a one-week course on security engineering, does not use any

end-of-course measurement instruments to assess how well students understand the training. The assumption is that if the students are there for class, they want to learn and must be retaining information. Finally, neither the Air Force Civil Engineer Support Agency nor the Force Protection Battlelab had any training tools or measurement instruments of their own. With possible sources exhausted, it became clear that to use a knowledge-based survey tool, the instrument would have to be created.

In an effort to hone in on current and relevant force protection topics, the experts mentioned above were contacted and asked the same question: “Do you have any stories or information about force protection failures, myths, or misconceptions from personnel in deployed locations?” The information obtained from these real-world scenarios became the foundation of the survey instrument. In addition to real-world events, the field experts were asked to formulate questions of their own design that would assess the knowledge level of engineer officers across the broad spectrum of force protection. Every question subsequently developed was then compiled into survey form; most of these questions were multiple-choice, but there were also several true or false questions. This initial draft survey instrument was distributed to each of the force protection experts to allow them to assess the validity of each question and determine whether the instrument as a whole represented a valid measure of a force protection knowledge. The instrument went through several iterations as various items were altered, added, or deleted altogether. The final survey, which contained 37 questions and covered the broad categories of blast mitigation and site design, was deemed worthy by the assorted experts.

In addition to the 37 questions on force protection, the survey asked respondents to provide some attitudinal information about their training experiences, as well as how they felt each class prepared them to address force protection challenges. Also, each respondent was asked to give some demographic data including rank, age, number of times deployed, and time since their last deployment. In all, there were eleven additional questions asked about attitudes and nine pertaining to demographic information. The survey can be seen in its entirety in Appendix A.

Testing the Survey

Once the draft survey was completed, it was pilot tested on 24 senior enlisted Air Force personnel in the Civil Engineer career field who were attending the WMGT 570 Civil Engineer Superintendents course. Although this sample was not drawn from the civil engineer officer population, these experienced senior enlisted leaders have more than fifteen years of experience in the civil engineer career field, and have been exposed to and often responsible for the implementation of force protection measures. The survey was distributed in paper copy to each person with the instructions that work was to be done alone and no references were to be used. The survey results were then entered into a database for preliminary analysis.

Initially, the survey results were examined from a content perspective to ensure consistency. For instance, if a question has four answers and no one in the pilot group picks a particular incorrect answer, then that answer is probably too far out of the realm of possibility to even be considered; therefore, the incorrect answer should be reworded so that it is closer to the correct answer. An example of this would be including the color

green to describe the color of the sun. Since the sun never appears to be green, this answer would never be selected, effectively eliminating the usefulness of that answer. Each answer to an item should be reasonable (Crocker and Algina, 1986:316).

Additionally, two parameters were used to analyze each item on the pilot survey. These parameters were the index of discrimination and point biserial correlation. To compute the index of discrimination, a researcher interested in selecting items that discriminate on the elements of the total test score divides the pilot study sample into upper and lower 50 percent halves. The index of discrimination for each item is then determined by subtracting the proportion of persons in the lower half answering the item correctly from the proportion of persons in the upper half answering it correctly (Crocker and Algina, 1986:315). In equation form, the index of discrimination is shown as,

$$D = p_u - p_l$$

where D is the index of discrimination, p_u is the proportion of respondents answering correctly whose total score was in upper fifty percent, and p_l is the proportion of respondents answering correctly whose total score was in the lower fifty percent.

Interpreting the index of discrimination is fairly simple. Ebel (1965) offered the following guidelines:

1. If $D \geq 0.40$, the item is functioning satisfactorily.
2. If $0.30 \leq D \leq 0.39$, little or no revision is required.
3. If $0.20 \leq D \leq 0.29$, the item is marginal and needs revision.
4. If $D \leq 0.19$, the item should be eliminated or completely revised.

The index of discrimination offers a quick look at the validity of items of examination, but it should not be used for the final decision. If a test is to have any statistical

significance, the point biserial correlation should be used (Crocker and Algina, 1986:319).

Therefore, the second parameter used in item analysis is the point biserial correlation. This parameter is used when a test developer wants to know how closely performance on any given item is related to the total test score. The point biserial correlation is found by subtracting the mean test score for the entire group from the mean test score for those who answered the item in question correctly and dividing by the group's standard deviation. This number is then multiplied by the square root of the item difficulty divided by its inverse. Item difficulty is simply the proportion of respondents who answered the item correctly (Crocker and Algina, 1986:317). In equation form, the point biserial correlation looks like this,

$$P_{pbis} = \frac{(\mu_+ - \mu_x)}{\sigma_x} \sqrt{p/q}$$

where P_{pbis} is the point biserial correlation coefficient, μ_+ is the average total score of respondents answering the question correctly, μ_x is the average total score of the complete group of respondents, σ_x is the standard deviation of the total score for the complete group, p is the proportion of respondents answering the question correctly, and q is the proportion of respondents answering the question incorrectly.

According to Crocker and Algina (1986), a reasonable value to use when comparing point biserial correlation is twice the standard error for the Pearson product moment correlation. The standard error for the Pearson product moment correlation is

simply one divided by the square root of sample size minus one. For the pilot study sample size of 24, the biserial correlation is 0.4. However, Crocker and Algina (1986) note that the use of this formula is based on a sample size of at least 50; for smaller sample sizes, they state that a lower correlation factor of 0.3 may be used.

After analyzing the data from the pilot study, it was discovered that 8 of the original 37 questions regarding force protection had negative point biserial correlation values, along with negative or near zero indices of discrimination. These questions were closely examined and modified as needed, based on the analysis parameters. In addition, 10 other items had point biserial correlation numbers that were just below the cutoff point of 0.3. These items were also examined and modified slightly. In order to make the items more effective, some wording was changed to better reflect the intent of the researchers. A second pilot study of the instrument is usually conducted, but due to time constraints it was not done for this research. This is a possible limitation of the instrument. In addition, no method of controlling for or measuring intelligence was included in the instrument.

Finally, factor analysis was performed on the instrument. The purpose of factor analysis is to determine if blocks of questions track together on specific areas of the test. Considering that the intent of the instrument was to measure blast mitigation and site planning, two main components should be observed in the factor analysis. However, none of the rotations used in a principal axis factor analysis supported this expectation. Although factor analysis was not helpful, the level of face validity and expert validity was sufficient to overcome doubts (Aronson, et al, 1990:282).

Distributing the Survey

The intended population of interest for this research was the Air Force civil engineer officer corps. To ensure the widest dissemination of the survey instrument among these officers, it was necessary to build a comprehensive e-mail distribution list using information obtained from the Air Force Personnel Center. The process of building the list is detailed in Appendix B. After every e-mail address was confirmed, a link containing the survey was sent out. Respondents merely had to follow the link to a public Internet server located at the Air Force Institute of Technology (AFIT) and spend ten minutes completing the survey instrument. After giving respondents 14 days to complete the survey, the data was downloaded from the server and entered into a database for analysis using the Statistical Program for the Social Sciences (SPSS) software.

Statistical Analysis

ANOVA

Analysis of variance (ANOVA) is a method used to determine whether differences in the means of a variable exist between subsections of the sample. For this study, ANOVAs were performed on several areas of the data. These areas included the average total score for each respondent who took a particular class compared with the average total score for those who had not taken the training, the average total score compared to the rank of each respondent, and the average total score compared to the

total number of courses taken. A level of significance of 0.05 was used in analyzing this data (McClave, et al, 2001:344).

Linear Multivariate Regression

The second technique used for analyzing the data gathered in this study was linear multivariate regression. Since ANOVAs do not reveal possible hidden variables, regression is necessary to further examine the data. This technique is invaluable when there are multiple independent variables influencing a single dependent variable. It was used in this study to reveal potential hidden effects that could be suppressed or spurious. A spurious relationship is a form of bias that occurs when a nuisance variable accounts for the observed relationship between dependent and independent variables (Schwab, 1999:77). The first step in the regression process was constructing a logical model that links total score to deployments via mediating variables. The model, shown in Figure 3-1, was based on the hypothesis that the number of deployments, controlling for how long ago the last deployment was, affected the requirement for a respondent to demonstrate knowledge of force protection principles. Next, the effect of confidence in applying and knowing FP concepts on being required to demonstrate knowledge was tested. Finally, the ability to apply concepts and knowledge of FP concepts were used to attempt to predict total force protection knowledge.

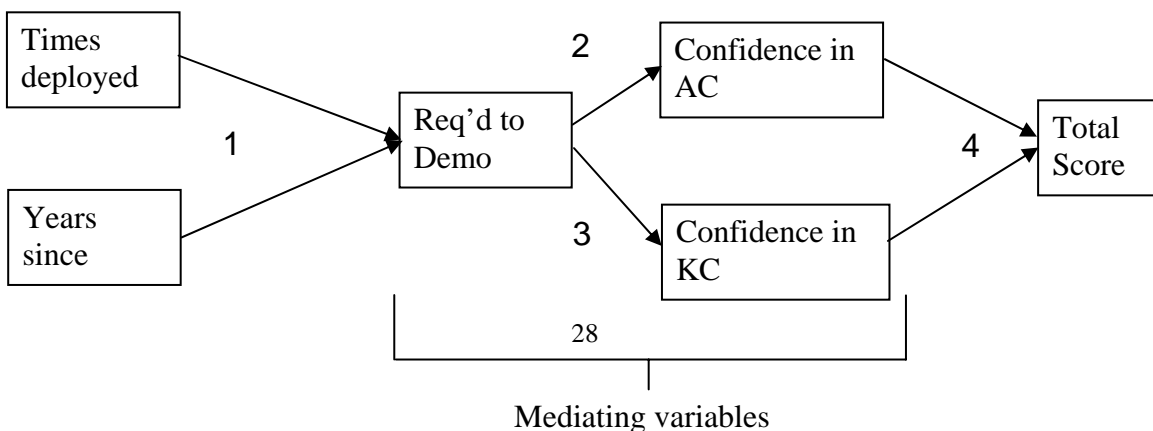


Figure 3-1 Mediated Model

The regressions performed for this model followed the same protocol for each rank. Four regressions were performed for each rank in a step-by-step manner. The first step in testing the model was to perform a regression to test the effect of the number of deployments and years since the last deployment against the dependent variable of feeling that they were required to demonstrate knowledge. The next step in the model was to test the extent to which respondents felt required to demonstrate knowledge against the dependent variables of confidence in the ability to apply force protection concepts, while the third step was to test the same independent variable against the dependent variable of confidence in knowledge of force protection concepts. The fourth and final step for testing the model was to test the relationship of two independent variables, confidence in ability to apply force protection concepts and confidence in knowledge of force protection concepts, against the dependent variable of total score.

IV. ANALYSIS

This chapter provides the statistical analysis of the data gathered using the survey instrument discussed in the previous chapter. Descriptive statistics are displayed for each data item. The data is then analyzed using two methods: analysis of variance (ANOVA) and linear multivariate regression.

Descriptive Statistics

Table 4-1 summarizes the response rate information. Of the 1525 people in the Air Force Personnel Command (AFPC) database, 1322 received e-mails. The difference was a result of data masked locations, persons currently out of the career field, and an inability to match the e-mail address on the global distribution list. There were 664 responses to the survey; however, 93 responses were either empty or vastly incomplete of data. For example, there were several instances where two or three questions were answered and the rest left blank. In addition, survey responses were considered unusable when demographic information, like rank and which training classes the person had attended, were left out of the response. The usable responses numbered 542, which represented a response rate of 41%.

Table 4-1: Survey Participation Results

Total Number of Emails Distributed	1322
Total Responses	664
Unusable Responses (Empty Data)	(93)

Total Number of Valid Responses	571
Ineligible Responses (Missing Demographic Data)	(29)
Total Number of Usable Responses	542
Final Usable Response Rate (542/1322)	41%

Table 4-2 is based on the number of usable survey responses and provides a breakdown of survey respondents by rank. This table shows that the response rate was greater in the lower ranks, although the upper ranks had a fair turnout as well. Captains provided the most responses (187), while Second Lieutenants had the highest response rate (41%). This may be an indication of interest in force protection at the Company Grade Officer level. One item of interest is the percentage of responses to the survey by rank. This percentage is nearly identical to the career field breakdown by rank, indicating that the sample drawn closely resembles the population.

Table 4-2: Response Rate by Rank

Rank	Total in Career Field ¹		# Valid Responses to survey	Overall Response Rate by Rank	Percentage of Responses to Survey by Rank
	Total #	Percent			
2Lt	139	9.11%	57	41.01%	10.52%
1Lt	266	17.44%	104	39.10%	19.19%
Capt	460	30.16%	187	40.65%	34.50%
Maj	338	22.16%	114	33.73%	21.03%
Lt Col	225	14.75%	58	25.78%	10.70%
Col	97	6.36%	22	22.68%	4.06%
TOTAL	1525		542	35.54%	100.00%

¹From AFPC Data Pull (28 Jan 2005). This number varies slightly with the number of emails sent out. Differences are due to personnel being in data masked locations, career broadening, or other assignments in which they are not on the global email address list. Percent column example (139/1525=9.11%)

Before discussing analysis of the results completely, the final scores on the 36-question portion of the survey are shown in Figure 4-1. The scores ranged from 9 to 33, with a mean of 21.88.

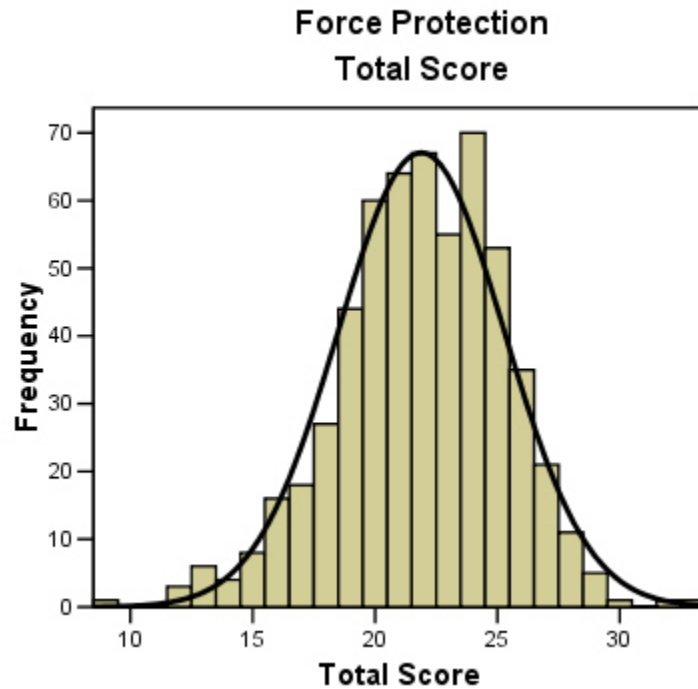


Figure 4-1: Total Score Distribution

Figure 4-2 is a boxplot that depicts the range of total scores for each rank. On this chart, rank is depicted on the x axis by number. Each number corresponds to the officer rank of the same number. For example, the rank 1 indicates O-1, a second lieutenant. The numbered circles represent outliers, cases where the total score was more than three standard deviations away from the mean. No significant difference was found between groups.

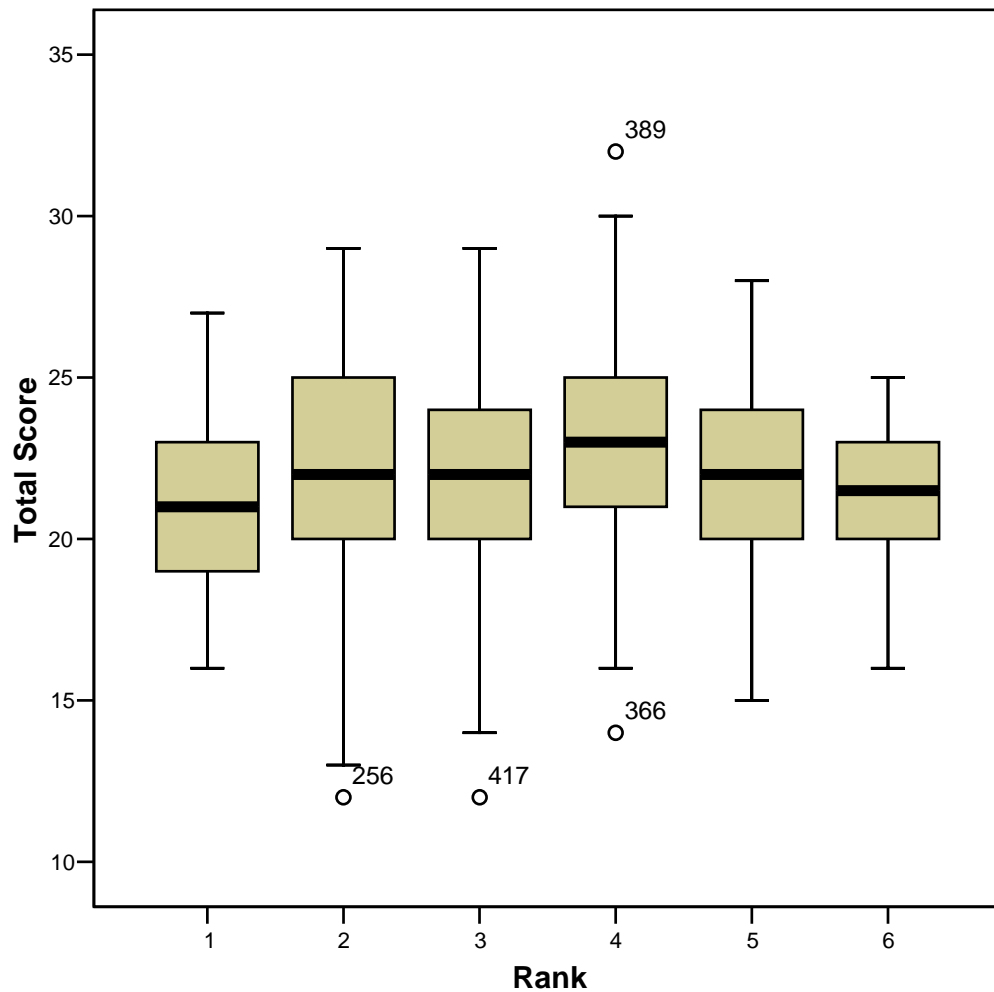


Figure 4-2: Range of Scores by Rank

Table 4-3 depicts the attendance numbers for each training course across the sample of respondents. Most Air Force Civil Engineers have attended MGT 101, since it is considered a mandatory training course for new accessions and serves as the foundation for future courses. MGT 585 is also considered mandatory and is typically attended by senior captains. Many officers have also been to a Silver Flag course at

either Tyndall AFB, Florida, Ramstein AB, Germany, or Kadena AB, Japan. There does not seem to be an emphasis on sending people to any of the other courses offering force protection education. The Army's Security Engineering Course has been offered for years, yet relatively few people have attended it. Combat Skills Training is a relatively new course, so it is expected to have low attendance numbers.

Table 4-3: Training Course Attendance

Training Course	Attended	% Attended
MGT 101	516	95.20%
MGT 585	166	30.63%
Silver Flag	399	73.62%
CoE Course	37	6.83%
Red Horse	58	10.70%
EOD	23	4.24%
Combat Skills Training	44	8.12%

Analysis of Variance

Analysis of variance (ANOVA) tests were performed to gain insight into the differences in mean total scores with respect to training courses taken and officer rank.

Training Courses

Table 4-4 illustrates the mean test scores for each training course. The significance of the difference between the mean is also listed. Note that each training course, with the exception of RED HORSE training and Combat Skills Training, was found to have a significant impact on FP knowledge. An interesting point to note here is that the Combat Skills Training, while billed as a force protection training course, did not have a significant impact on FP knowledge. One reason for this might be the fact that the training pertains more toward personal defense, convoy operations, and other skills that AF civil engineers do not traditionally require. Since the survey instrument did not cover these areas, it is not surprising to see that this course did not significantly affect FP knowledge. To further investigate the impact of training on force protection knowledge, ANOVAs were performed to assess the impact of training on force protection knowledge while controlling for rank.

Table 4-4: ANOVA For Each Course

Training Course	Mean	Number	Sig
MGT 101			
Attended	22.06	516	0.000
Did Not Attend	20.04	54	
MGT 585			
Attended	22.52	166	0.003
Did Not Attend	21.6	404	
Silver Flag			
Attended	22.27	399	0.000
Did Not Attend	20.91	171	
CoE Course			
Attended	23.97	37	0.000
Did Not Attend	21.72	533	
RED HORSE			
Attended	21.86	58	0.995
Did Not Attend	21.87	512	
EOD			
Attended	23.87	23	0.003
Did Not Attend	21.78	547	
Combat Skills Training			
Attended	22.23	44	0.458
Did Not Attend	21.83	526	

Rank

Controlling for rank among the respondents was important because the mandatory training classes occur at specific times in a person's career. For instance, MGT 101 is traditionally for new accessions in the Air Force civil engineer career field, while MGT 585 is geared toward senior captains with plenty of experience. Therefore, ANOVAs were performed on the total scores of each rank with respect to the different training classes. Surprisingly, when controlling for rank, ANOVAs revealed no statistically significant influence except in three situations. However, the effects that were found were in the correct direction; in other words, the average score of a group having training was higher than that of the group without it. This observation held true for each training

class. Unfortunately, these differences were typically not significant. The exceptions to this generalization were the Army Security Engineering Course for captains and the Army Security Engineering Course and Silver Flag training for majors. Captains who had taken the Army Security Engineering Course had significantly higher average total scores than those who had not, with an F statistic of 4.616 ($p < 0.05$). Majors taking the Security Engineering Course also had significantly higher scores than Majors who did not take the course, with an F statistic of 7.171 ($p < 0.01$). The Silver Flag training also had a significant impact on the average scores for Majors, with an F statistic of 7.587 ($p < 0.01$).

Linear Multivariate Regression

Linear regressions were performed on the model described in Chapter III for each rank from second lieutenant to colonel. The results for each test are easiest to view in tabular form; therefore, a table will be included in each section.

Second Lieutenant

Table 4-5 depicts the results of the linear regression test of the proposed model for Second Lieutenants. The first regression indicated that deployments had no impact on whether respondents felt they were required to demonstrate knowledge. However, the second and third steps indicate that feeling the requirement to demonstrate knowledge had a significant impact on confidence in applying concepts as well as confidence in force protection knowledge. Additionally, the fourth regression indicates that confidence in applying concepts has a significant positive impact on the total score.

Table 4-5: Second Lieutenants

Step	Sig	R ²	Dependent Variable	Independent Variable	Beta	t-stat	Sig
1	0.274	23%	Required to demonstrate knowledge	Number of deployments	0.496	1.675	0.125
				Years since last deployment	-0.064	-0.216	0.833
2	0.001	19%	Confidence applying concepts	Required to demonstrate knowledge	0.439	3.560	0.001
3	0.005	14%	Confidence FP knowledge	Required to demonstrate knowledge	0.369	2.945	0.005
4	0.034	12%	Total score	Self efficacy applying concepts	0.308	2.223	0.031
				Self efficacy FP knowledge	0.091	0.658	0.514

First Lieutenant

The results of the linear regression test of the proposed model for First Lieutenants are illustrated in Table 4-6. The first regression indicated that deployments had no significant impact on whether respondents felt they were required to demonstrate knowledge. Again, the second and third steps indicate that feeling the requirement to demonstrate knowledge had a significant impact on confidence in applying concepts as well as confidence in force protection knowledge. In contrast to the test on Second Lieutenants, the fourth regression indicates that confidence in force protection knowledge has a significant positive impact on the total score, as opposed to confidence in applying concepts.

Table 4-6: First Lieutenants

Step	Sig	R ²	Dependent Variable	Independent Variable	Beta	t-stat	Sig
------	-----	----------------	--------------------	----------------------	------	--------	-----

1	0.790	1%	Required to demonstrate knowledge	Number of deployments	0.090	0.631	0.531
				Years since last deployment	0.005	0.032	0.974
2	0.000	21%	Confidence applying concepts	Required to demonstrate knowledge	0.463	5.275	0.000
3	0.000	14%	Confidence FP knowledge	Required to demonstrate knowledge	0.375	4.084	0.000
4	0.007	9%	Total score	Self efficacy applying concepts	-0.076	-0.788	0.433
				Self efficacy FP knowledge	0.308	3.207	0.002

Captain

Table 4-7 shows the results of the linear regression test of the proposed model for captains. The first regression indicated that deployments had no significant impact on whether respondents felt they were required to demonstrate knowledge, with a significant value between that for first and second lieutenants. The second and third steps continue to indicate that feeling the requirement to demonstrate knowledge had a significant impact on confidence in applying concepts as well as confidence in force protection knowledge. The fourth regression indicates that confidence in force protection knowledge has a significant positive impact on the total score, as opposed to confidence in applying concepts. This final regression is in step with that shown by the First Lieutenant group.

Table 4-7: Captains

Step	Sig	R ²	Dependent Variable	Independent Variable	Beta	t-stat	Sig
------	-----	----------------	--------------------	----------------------	------	--------	-----

1	0.372	1%	Required to demonstrate knowledge	Number of deployments	0.091	1.034	0.303
				Years since last deployment	-0.045	-0.509	0.612
2	0.000	30%	Confidence applying concepts	Required to demonstrate knowledge	0.549	8.937	0.000
3	0.000	9%	Confidence FP knowledge	Required to demonstrate knowledge	0.303	4.327	0.000
4	0.005	6%	Total score	Self efficacy applying concepts	-0.100	-1.358	0.176
				Self efficacy FP knowledge	0.243	3.285	0.001

Major

The linear regression test of the proposed model for Majors is detailed in Table 4-8. The first regression indicated that deployments had no significant impact on whether respondents felt they were required to demonstrate knowledge. The second and third steps reiterate the feeling that the requirement to demonstrate knowledge had a significant impact on confidence in applying concepts as well as confidence in force protection knowledge. The fourth regression indicates, for the first time in this sequence of tests, that confidence in applying concepts and confidence in force protection knowledge have no significant impact on the average total score for the rank of Major.

Table 4-8: Majors

Step	Sig	R ²	Dependent Variable	Independent Variable	Beta	t-stat	Sig
------	-----	----------------	--------------------	----------------------	------	--------	-----

1	0.160	4%	Required to demonstrate knowledge	Number of deployments	0.175	1.679	0.096
				Years since last deployment	-0.025	-0.237	0.813
2	0.000	27%	Confidence applying concepts	Required to demonstrate knowledge	0.518	6.414	0.000
3	0.000	16%	Confidence FP knowledge	Required to demonstrate knowledge	0.403	4.636	0.000
4	0.179	3%	Total score	Self efficacy applying concepts	-0.069	-0.715	0.476
				Self efficacy FP knowledge	0.176	1.836	0.069

Lieutenant Colonel

Table 4-9 summarizes the linear regression test of the proposed model for Lieutenant Colonels. The first regression indicated that deployments had a nearly significant impact on whether respondents felt they were required to demonstrate knowledge. In fact, if a $p < 0.10$ was used, this finding would be considered significant. This regression seems to break down between the second and third steps; feeling the requirement to demonstrate knowledge had a significant impact on confidence in applying concepts but not on confidence in force protection knowledge. The fourth regression indicates that confidence in applying concepts and confidence in force protection knowledge had no significant impact on the average total score. However, confidence in force protection knowledge was found to be a significant variable.

Table 4-9: Lieutenant Colonels

Step	Sig	R ²	Dependent Variable	Independent Variable	Beta	t-stat	Sig
------	-----	----------------	--------------------	----------------------	------	--------	-----

1	0.099	10%	Required to demonstrate knowledge	Number of deployments	0.289	1.954	0.057
				Years since last deployment	-0.051	-0.343	0.733
2	0.000	25%	Confidence applying concepts	Required to demonstrate knowledge	0.498	4.299	0.000
3	0.106	5%	Confidence FP knowledge	Required to demonstrate knowledge	0.215	1.644	0.106
4	0.114	8%	Total score	Self efficacy applying concepts	-0.047	-0.357	0.723
				Self efficacy FP knowledge	0.281	2.124	0.038

Colonel

The linear regression test of the proposed model for the Colonel rank is depicted in Table 4-10. The model was very inconsistent in attempting to predict total score through regression of these variables. In fact, the only significant measure observed was the impact that feeling required to demonstrate knowledge had on confidence in applying concepts.

Table 4-10: Colonels

Step	Sig	R ²	Dependent Variable	Independent Variable	Beta	t-stat	Sig
------	-----	----------------	--------------------	----------------------	------	--------	-----

1	0.317	13%	Required to demonstrate knowledge	Number of deployments	0.132	0.561	0.582
				Years since last deployment	-0.295	-1.247	0.229
2	0.001	45%	Confidence applying concepts	Required to demonstrate knowledge	0.671	4.050	0.001
3	0.168	9%	Confidence FP knowledge	Required to demonstrate knowledge	0.305	1.432	0.168
4	0.428	9%	Total score	Self efficacy applying concepts	0.201	0.911	0.373
				Self efficacy FP knowledge	-0.236	-1.070	0.298

Additional comments

After finishing the survey, respondents were provided the opportunity to submit comments pertaining to how they thought force protection training should be implemented and pursued. The comments given are tabulated by rank in Appendix C. Most of the comments provide very thoughtful insight and suggestions that could be beneficial when planning force protection instruction.

V. CONCLUSION

The objective of this study was to assess the state of force protection knowledge in the Air Force Civil Engineer career field. In order to accurately gather data, four research questions were asked. These questions will be addressed one by one to synthesize a complete picture of force protection knowledge in Air Force Civil Engineer officers. The chapter will conclude with recommendations for leadership as well as possible areas of future research.

Research Questions

1) Do civil engineer officers understand the principles and concepts of force protection in a deployed environment?

The data gathered in this research came from a brand new instrument, formed using the advice and opinions of experts, with the goal of assessing a large body of knowledge with a small number of questions. There was no established benchmark to compare respondents' scores with, and thus hard to determine the knowledge level of CE personnel.

2) Is current training effective at instilling force protection knowledge in CE officers?

The results of this research indicate that current training can have a positive effect on the force protection knowledge level in certain circumstances. However, the effectiveness of the existing curriculum of classroom training with respect to force

protection is questionable. Attendance at MGT 101 and MGT 585 did not have a significant effect on the total scores of respondents after controlling for rank. The classroom-based course that did have a significant impact on total score was that given by the Army Corps of Engineers. One reason this training had such an impact could have been because it is a week long course geared specifically toward force protection. In this environment, students probably feel a greater need to absorb and retain the training that is offered.

Silver Flag training also had a significant impact on the total score of one rank of officers. This training moves students out of the classroom and into the field, where they are able to have hands-on training. Intuitively, hands-on training may have a greater effect on retention of force protection knowledge, and the results of this study seem to support this.

3) Which training is most effective at teaching FP, and which needs improvement?

This research indicates that of the existing training, the Army Corps of Engineers course and the Silver Flag site training seem to have significant effects of force protection knowledge. As previously mentioned, the Army's Security Engineering course is focused tightly on force protection and consists of a week of training in this area. The Silver Flag experience allows trainees hands-on force protection application to see for themselves why certain measures are effective.

The MGT 101 and MGT 585 classes, neither of which claim to be force protection specific training, had no significant impact on the FP knowledge of respondents. The reasons for this could include the fact that force protection is only represented in a block of one or two hours. In addition, these classes cover many

subjects, so students may not recognize the importance of the force protection section.

Finally, there is no hands-on force protection training associated with MGT 101 or MGT 585. This shortcoming forces students to leave with book knowledge alone, without the opportunity to put the concepts to work.

4) How do Civil Engineer officers feel about the training they receive and their readiness to apply it to real world situations?

Air Force Civil Engineers overall seem to believe that the training they receive is worthwhile and relevant. Although AF civil engineers have a history of accomplishing great things with little preparation or planning, force protection is not something to be taken lightly. A fully trained AF civil engineer officer, knowledgeable of the concepts and principles of force protection and comfortable with the fact that support is only a phone call away, will fare much better than an officer in a deployed location making it up on the fly and hoping things do not go wrong. After all, putting up a tent can be redone if needed, but once something goes wrong with force protection, it is usually too late.

Recommendations

There are several things that can be done to ensure that the existing force protection knowledge is enhanced. It will require the partnership of training entities, drafters of policy, experts in the field, and senior leadership to accomplish, but with an area as vital as force protection, it will be worth the effort.

- Implement a training course for force protection. This course could fill the gap between MGT 101, where basic principles can be taught, and MGT 585, where

things become too top-level for technical learning. The training course should be hands-on and rigorously tested to ensure competency.

- Continue to work together with other DoD entities to accomplish force protection goals. Sister services are beginning to work together to publish Unified Facilities Codes and other documents that help in the design phase. However, more documentation is needed for deployed environments.
- Educate senior leaders. Empirical evidence provided in this study suggests that company grade officers have a greater technical knowledge of force protection. This emphasizes the importance of senior leaders relying on the technical capability of their subordinates.
- Emphasize force protection training at the home station level. This type of training could easily be done on a Prime BEEF day, and it could serve to reinforce concepts learned in a force protection class for those who have been, while introducing younger troops to the ideas.
- Include force protection training in weeks leading up to deployment. In addition, train to use the computer spreadsheet programs used by the Army.

These are just a few ideas senior leaders and squadron commanders could implement to ensure their troops fully understand force protection and its implications.

Future Research

Future research could proceed down many avenues. One important area where work can be done is in refining and validating the survey instrument used to gather data. This instrument was built from scratch using the input of several experts in the field. In time, new concepts may evolve and new ways to test knowledge may become evident.

Another avenue for future research is in exploring what our sister services are doing to ensure their troops are protected in dangerous places. This study relied extensively on knowledge from the Army, and did not include inputs from the Navy or Marine Corps. The main reason for this is that the Army seems to have taken the lead in force protection, but it would be interesting to know what the other services do.

A third area for future study would be the force protection knowledge of enlisted personnel in CE. Oftentimes, an enlisted troop may be in charge of constructing bunkers or revetments. Therefore, it would be useful to know how much they understand about tasks that increase force protection.

Finally, an in-depth study of what current training courses' goals are and whether they accomplish them could be conducted. This type of study would assess the content of each course and generate a comprehensive instrument to test the knowledge retained from each experience. This would allow decision makers to make inferences about the efficacy of current training.

APPENDIX A: SURVEY INSTRUMENT

A SURVEY TO ASSESS THE FORCE PROTECTION KNOWLEDGE OF AIR FORCE CIVIL ENGINEERS

Conducted by the

AIR FORCE INSTITUTE OF TECHNOLOGY

AIR UNIVERSITY (AETC)

DEPARTMENT OF THE AIR FORCE

for

The Air Force Civil Engineer Support Agency

About the Study

Purpose: The purpose of the study is to determine the adequacy of Air Force civil engineering force protection (FP) training by assessing the current knowledge level of Air Force civil engineers with respect to general engineering principles.

Confidentiality: We would greatly appreciate you completing the survey. **Your answers are important.** Your perceptions and actual experiences are essential. **ALL ANSWERS ARE STRICTLY CONFIDENTIAL.** No one outside the research team will ever see your questionnaire. No identification of individual responses will occur. We ask for some demographic information in order to interpret results more accurately and make comparisons between large groups.

Disposition: We will provide a report to the Air Force Civil Engineer Support Agency. We can also make the results available to you if requested.

Time Required: It will probably take you 10-15 minutes to complete this questionnaire.

Suspense: Please complete the survey **NLT Friday, 18 Feb 2005.** This survey is completely voluntary. No adverse action will be taken against anyone choosing not to participate.

Contact Information: If you have any questions or comments regarding this survey, you may contact us via email, mail, or phone. Thank you very much for your participation.

Sincerely,

//Signed//

Lt Dustin C. Richards
Air Force Institute of Technology/ENV
2950 Hobson Way
WPAFB OH 45433
dustin.richards@afit.edu

//Signed//

Dr Alfred E. Thal, Ph.D.
Air Force Institute of Technology/ENV
2950 Hobson Way
WPAFB OH 45433
alfred.thal@afit.edu

Privacy Act Statement

Authority: We are requesting disclosure of personal information, to include your Social Security Number. Researchers are authorized to collect personal information (including social security numbers) on research subjects under The Privacy Act-5 USC 552a, 10 USC 55, 10 USC 8013, 32 CFR 219, 45 CFR Part 46, and EO 9397, November 1943 (SSN).

Purpose: It is possible that latent risks or injuries inherent in this experiment will not be discovered until some time in the future. The purpose of collecting this information is to aid researchers in locating you at a future date if further disclosures are appropriate.

Routine Uses: Information (including name and SSN) may be furnished to Federal, State and local agencies for any uses published by the Air Force in the Federal Register, 52 FR 16431, to include, furtherance of the research involved with this study and to provide medical care.

Disclosure: Disclosure of the requested information is voluntary. No adverse action whatsoever will be taken against you, and no privilege will be denied you based on the fact you do not disclose this information. However, your participation in this study may be impacted by a refusal to provide this information.

1. The most effective means of blast mitigation is:
 - a. Access Control.
 - b. Standoff distance.
 - c. Facility hardening.

2. The wing commander wants to stop using ROWPUs for water production and implement a service contract for the supply of water from an off base source. What is the best method of delivering this water to the base system?
 - a. Create an off base water delivery point
 - b. Escort water delivery trucks from the base ECP to the central water plant
 - c. Issue passes to trusted contractors to come and go with the daily water delivery.

3. At what level of protection will damaged structures be irreparable?
 - a. Very Low
 - b. Low
 - c. Medium
 - d. High

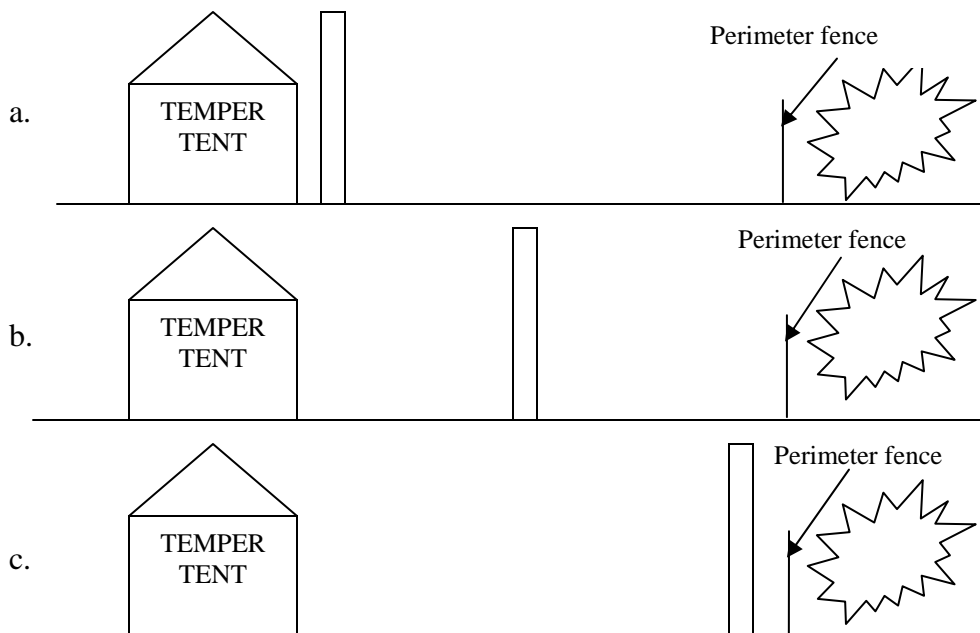
4. When preparing for possible explosive attack which of the following actions will best eliminate the threat of flying glass shards in existing buildings occupied by U.S. Forces?
 - a. Remove the glass from the windows and replace it in the frame with Plexiglas
 - b. Put Mylar film on the window
 - c. Mount plywood in place of the window
 - d. Replace the window with plastic sheeting

5. What organization is responsible for the Vehicle Bomb Mitigation Guide?
 - a. AFCESA
 - b. Force Protection Battlelab
 - c. AFCEE
 - d. CENTAF

6. True or False: Polyester film (Mylar) applied to windows strengthens them and keeps them from breaking.

7. The wing commander wants you to protect the base chapel from flying debris in the event of a blast at the base perimeter. Due to Host Nation requirements, the chapel is only 50 feet from the base perimeter. You should do which of the following:

- a. Build 3 ft high sand bag walls around the facility.
 - b. Place 10 ft tall reinforced concrete barriers (i.e., Bitburg barriers) around each wall.
 - c. Place sand filled HESCO barriers stacked 2 layers high on the perimeter side of the facilities.
8. True or False: In an expedient environment, adhering duct tape in an “X” or “starburst” pattern on windows is an effective method to reduce risk of glass shrapnel in the event of a blast.
9. Which tent has the best chance of surviving a blast from a 5000lb bomb?
- a. A tent hardened with HESCO barriers 175 ft from the blast.
 - b. A tent hardened with a sandbag wall 275 ft away from the blast.
 - c. A non-hardened tent 375 ft away from the blast
10. True or False: Most windows have some protective ability due to the inherent blast resistance of glass.
11. The wing commander directed CE to install a fragmentation wall of reinforced concrete barriers between the perimeter fence and the billeting tents. Which is the best location for this wall?



12. The best way to deal with doors in existing buildings that are occupied by US Forces is to:

- a. Remove them
- b. Reinforce them with horizontal stiffeners or steel sheeting
- c. Provide an interior wall behind them to intercept the door when it fails.

13. True or False: Air Force Handbook 10-222 deals with Force Protection for Civil Engineers.

14. Which of the following is the best method for constructing an expeditionary power plant?

- a. Construct a centralized generator power plant with a simple power grid
- b. Place generators at several location and connect them through a power grid
- c. Only provide power and backup power to essential facilities

15. True or false: Occupying/inhabiting existing facilities is preferable to erecting TEMPER tents.

16. In a tent what causes the most casualties from a mortar?

- a. Structural collapse
- b. Flying debris (glass and bricks)
- c. Blast
- d. Bomb fragments

17. When designing the layout for an expeditionary site with ample distance between the base and perimeter, what is the ideal location for mission critical facilities?

- a. In close proximity to sleeping quarters for quick response
- b. Next to the flight line
- c. At the center of base

18. Base Intel states that the biggest threat of attack is by indirect fire methods such as mortars. The base commander tells you to reduce the vulnerability—he doesn't want anyone injured. Which of the following actions should you take?

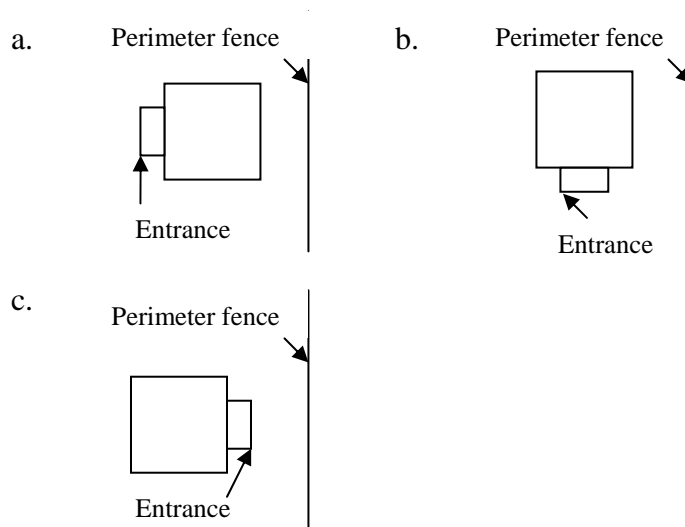
- a. Harden facilities to withstand a direct hit.
- b. Harden facilities to reduce casualties from frag and debris.
- c. Compartmentalize areas with large concentrations of personnel
- e. b and c

19. When your primary threat is unguided mortars and rockets what is the most important consideration when designing expedient bunkers?

- a. Required roof strength
- b. Accidental collapse
- c. Personnel capacity of bunkers

20. True or False? The only effective solution to direct fire threats is ballistic resistant walls, sandbags, Hesco Bastions, or similar “barriers.”

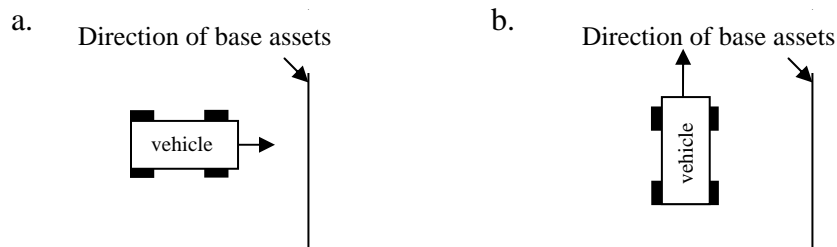
21. Which of the following options is best for facility layout?



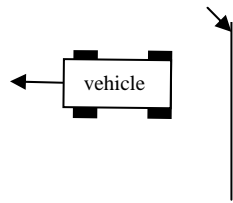
22. Which organization should you contact first with your force protection concerns?

- a. AFCESA
- b. Force Protection Battlelab
- c. AFCEE
- d. S.A.M.E.

23. You are working with SFS to lay out the Entry Control Point on the perimeter of a new bare base. Which is the best alignment for vehicles entering the ECP?



c. Direction of base assets



24. In a multistory building what causes the most casualties from a large vehicle bomb?

- a. Structural collapse
- b. Flying debris (glass and bricks)
- c. Blast
- d. Bomb fragments

25. Which of the following facility types requires the least amount of standoff distance?

- a. Billeting tents
- b. Primary gathering facilities
- c. Inhabited buildings

26. At what level of protection are some minor injuries expected, but fatalities unlikely?

- a. Very Low
- b. Low
- c. Medium
- d. High

27. True or False: A perimeter wall at least 3 meters high will significantly reduce blast effects on structures behind it.

28. Construction that provides protection against weapon fragments and small arms fire and prevents magnification of blast pressure from reflection off vertical surfaces is:

- a. Semi-hardened construction
- b. Splinter protected construction
- c. Protected construction

29. True or False: A bomb will have the same effect no matter where it detonates.

30. What method of perimeter wall construction is most effective at preventing a vehicle bomb from breaking through to detonate on base?

- a. Water filled jersey barriers

- b. Concrete Jersey barriers tied together with steel cable
 - c. Earth filled HESCO barriers
31. True or False: Bombs that do not cause structural failure usually do not cause many injuries.
32. Who published the Installation Force Protection Guide?
- a. AFCESA
 - b. Force Protection Battlelab
 - c. AFCEE
 - d. ACC/CE
33. What is the intent of the Anti-Terrorism minimum building standard?
- a. To reduce the impact of attacks on the installation mission
 - b. To eliminate the chance of death to occupants from vehicle bombs
 - c. To reduce damage to installation infrastructure
 - d. To reduce the likelihood of mass casualties
34. In order to apply force protection considerations to a design of a facility what do you need to know?
- a. Threat and the desired level of protection
 - b. Troop strength available and available standoff
 - c. Available standoff amount of revetment and sandbags available
35. True or False: The taller the vehicle barrier, the better the protection.
36. In a single single story building what causes the most casualties from a large vehicle bomb?
- a. Structural collapse
 - b. Flying debris (glass and bricks)
 - c. Blast
 - d. Bomb fragments
37. An explosive with a light metal casing causes the most danger with:
- a. Primary fragmentation
 - b. Fire from the blast
 - c. The blast wave

Attitudinal – Using the following scale, indicate your level of agreement with the following statements:

1 2 3 4 5
strongly disagree, disagree, neutral, agree, strongly agree

1. I think answered most of the previous force protection questions correctly.
2. I understand basic force protection concepts.
3. I have received adequate force protection training.
4. I can effectively apply force protection concepts to real world problems.
5. I have been required to demonstrate my force protection knowledge and skills in a real world environment.
6. I know where to go for help with force protection issues I have in my job.
7. I think that the Air Force does a good job at promoting force protection.
8. I think the AF civil engineering career field does a good job at promoting force protection.
9. I have enough guidance to effectively mitigate FP threats to Air Force facilities and infrastructure.
10. I have enough engineering options to cost effectively mitigate FP threats to Air Force facilities and infrastructure.
11. I have enough engineering support from Air Force civil engineer staff level agencies (MAJCOMs, Air Staff, AFCESA, AFCEE, etc) to effectively mitigate FP threats to Air Force facilities and infrastructure.

Demographic

1. Indicate your rank: O-1, O-2, O-3, O-4, O-5, O-6
2. How old are you? (Drop down box with ages from 21-55)
3. Check all applicable training courses you have attended:
 - AFIT MGT 101
 - AFIT MGT 585
 - USAF Silver Flag Training
 - CoE Security Engineering course
 - Red HORSE specific training
 - EOD specific

- Combat Skills Training
- Other (please specify)

4. Indicate the amount of force protection knowledge you recall learning in each of the training courses using the following scale: 1- none, 2-very little, 3-some, 4-a lot, 5-don't know

- AFIT MGT 101
- AFIT MGT 585
- USAF Silver Flag Training
- CoE Security Engineering course
- Red HORSE specific training
- EOD specific
- Combat Skills Training

5. Please check the box(es) that best reflect your education level:

- B.A.
- B.S.
- M.A.
- M.S.
- PhD

6. How many times have you deployed in your career?

7. How many years has it been since you last deployed? Never, <1, 1, 2, 3, 4, 5, 6, 7, 8, 9,>10

8. In your opinion, what is the best way to ensure everyone understands Force Protection?

- a. Increased home station training
- b. AFIT training class
- c. Hands on training
- d. External training (e.g., Army CoE Security Engineering Course)
- f. other – write in space provided

Field for write in answers to question 8.

9. If you have any additional thoughts or comments, please make them below:

Field for write in answers to question 9.

APPENDIX B: Building the survey distribution list

Since the Air Force Personnel Command (AFPC) does not keep a database of up to date email addresses for Air Force personnel, it was necessary to build a distribution list from scratch. AFPC provided a Microsoft Excel worksheet with the name and base of every officer in the Civil Engineer career field. From this list, a distribution list was built using the concatenate function in Excel. The construct used was firstname.lastname@base.af.mil. Once these e-mail addresses were generated, they were checked against the Air Force global distribution list. Several hundred names were unable to be verified. These names were cross checked one at a time. The first check was to determine if some bases had different conventions for email. Next was to check each person individually by name in the global. Many of the discrepancies were resolved in this fashion. In addition, there were several people found to be outside the career field at this time. These addresses were found in a hit and miss fashion. Finally, personnel in data masked locations did not receive the survey. The final number of e-mails sent out was 1322 out of 1525 personnel in the AFPC database.

APPENDIX C: Additional Comments Sorted by Rank

Colonel
Sometimes the best training you get is when the inspector leaves a report card. Force Protection is only as good as the direction/support the MAJCOM and Wing/CCs give to it...and before an incident increases their involvement.
Some of the questions were not easily answered by the choices--should have had opportunities to respond after very 3-4 to add comments--can't go back from here.
train as you fight so you can fight as you trained. let the civilians and contractors maintain the CONUS bases; let the military engineers train to deploy and sustain operations.
If we allow the Battle Lab or the SF folks to lead the way with any solutions to FP and Integrated Base Defense we will fall short in protecting our people.
I expect Lts and Cpts to be more current on pubs and specific criteria in a "start at zero" environment. I expect Sr. leaders to be able to be quickly refreshed on those issues they need to be directly involved in decision making on. Felt some questions left me saying "that depends" vice going directly to the choices. Good luck on the survey--I think the results can impact our officer development.
I have not had any formal FP trng, only what I have picked up over the years. I would be interested in my score.

Lieutenant Colonel
Some of the questions/answer options were poorly worded.
Engineers and Security Forces are the only career fields that seem interested and concerned about ATPF. FP needs to be a wing-wide concern with emphasis starting at the top.
A combination of home station and hands on training are required. It is essential the training be led by qualified personnel and not simply the local guru passing on what they think is correct. I believe there are good guides available, but little has been done to ensure folks are aware of them and know how to get them.
While I believe force protection guidance exists, to my knowledge there is no convenient "Field Manual." If not, it might be a good idea to produce one similar to the Airman's Manual.
I did not answer some of the questions because I did not think they were worded properly, or gave enough information.
A survey is fine, but as a CE squadron commander in the desert I had plenty of resources to consult before I made a force protection decision. I never had to make a call on the fly, which is what I basically had to do in answering the questions on this survey.
Force protection training is different than construction & other techniques to mitigate attacks...ex: I know to vary my route, I don't know what type of barrier and its location to mitigate specific types of threats.

<p>Interesting survey...there are definitely areas I did not know the answer, but in many cases I believe FP to be good common sense. I see the main problem is the resources available to execute FP measures coupled with a select group trying to implement FP measures based on desire versus actual threat.</p>
<p>One-stop shopping for all requirements would be nice rather than jumping from this guidance to that pamphlet. One of the water-proof deployable flip manuals would be great. Should be based on threat (IE. you have this threat, here is what you should look at doing).</p>
<p>When I went to 585, we discussed our deployments--we were not taught FP techniques. I was BCE at Riyadh when bomb went off in Dahrn and I was flying by the seat of my pants. I hope that we are doing a better job training our young officers in MGT101??</p>
<p>For those folks who have been at the MAJCOM and Air Staff for some time, practical, hands-on knowledge is not always there. These folks need training as well because when deployments come up, they go as well.</p>
<p>Since I'm assigned to the Defense Threat Reduction Agency, I'd suggest you include them as a resource. Not only do they complete the JSIVA inspections, they also run a 24/7 reachback operation that addresses both WMD and explosive/blast requests for information. If you'd like to know more, please don't hesitate to contact me, Lt Col Carl Jerrett, at 703-325-1051; DSN 221-1051.</p>
<p>It ALL depends on the THREAT. Your questions were very focused on specific threat. I dealt with rockets primarily in Iraq. We looked at things very different. Additionally, not much protection could do for you unless you were using it when the rocket arrived. Best use would be in sleeping quarters and gathering places. Bunkers had limited use since you never had time to get to one.</p>
<p>Even though I was assigned for a year in a high threat environment where explosive threats were very real and we worked closely with JSIVA and others to ensure our safety, I am obviously not well enough versed in the addressed topics. I fear I am not alone. Today's AF CE and MSG leaders need to know this better than I currently do. It truly is a life an death issue. What training is available?</p>
<p>Much of my basic CE training I experienced earlier in my career did nto address current threats of today. Need refresher training for older officers. I do believe many younger officers are gettign the training to help though.</p>
<p>I took this test off the top of my head; without referencing any of the publications available on FP design/construction. I believe I do know where to find all the "right" answers if needed - through the Airman's Handbook and the 10-222 series on setting up and operating a bare base. I don't use this info at all in my current job (and not much while I was deployed to Al Udeid). The FP info I do use and know is the personal protection/being aware of suspicious activity line.</p>

Major

The AF needs to emphasize the importance of overhead cover and the reality of what damage indirect fire weapons can cause. In Iraq, I saw plenty of "Camp Cupcakes"--modular, trailer units with air conditioning--a huge waste--I'd trade HVAC for overhead cover any day. My unit was lucky to have been billeted in old prison cells with 3 foot reinforced concrete roofs and 2 ft concrete floors and walls--but others in the Baghdad and Balad area were not so lucky.

Many of your questions did not provide all the information to answer the questions. To provide the appropriate response requires knowing the threat and the level of protection. Without specific information such as weapon yield, stand-off distance, required level of protection, time and materials available, and a whole lot of specific situational information, I could answer many of the questions with different answers depending on all the variables required to provide proper protection. I could not figure out what you were asking in question 3 at all.

The Homestation FP training needs to be technically tailored to the level of authority and how they will implement those concepts.

This survey had several vague or improper questions with options that were all bad or all good. You should be careful about how much emphasis on the results of questions that can be interpreted several different ways.

AF CE does a VERY poor job at technical engineering training for force protection, and technical training in general. Engineers in uniform must understand military applications of engineering, i.e. combat engineering and force protection engineering, otherwise we have no reason to exist as uniformed airmen and might as well be replaced with contractors or Gov't civilians.

Force protection training should be geared towards your expected use. ie Individual v. facility design, or commander perspective.

Suggest when you publish your findings, you make them more readily available to the AF CE community...much like you sent out the e-mail to a wide audience for this survey.

Videos with home station training drive the points home. It's been a little while since I've had this type of training as I've been stationed outside of Prime BEEF from 1999-2004.

A much needed look at our focus on FP. I learned everything I know and its importance from my deployment to Al Udeid during base transition out of contingency to steady-state ops...would like to know how I scored. stephen.blake@pentagon.af.mil

Important topic, but difficult questionnaire to answer. You didn't provide many of the specifics that help determine the appropriate course of action. Therefore, I felt like I was guessing at what the "correct" answer should be.

I received most of my FP indoctrination while deployed in 1996 to PSAB. While stateside the importance of FP has not been emphasized enough. The biggest thing I learned while deployed was the importance of standoff distance. Since then I haven't had to use my FP knowledge or even attended a class in relation to FP.

I have been out of the mainstream CE career field for 6 years so my knowledge of

current practices/initiatives is somewhat limited.
Some of the questions seemed impossible to answer correctly, or had more than one right answer, not sure if it will skew your results. Example, question 4 how to eliminate glass shards - two answers (replace with plywood or replace with plastic) would both eliminate glass shards. I think you might have been getting at the frame's integrity with the plywood - the frame will still blow out of the wall with plywood in it, but either answer I think is correct... Also, some of the questions about "best" ways to do something (14 - generator placement) depends on many variables (manning, noise, etc) not just FP. Perhaps reword to say "considering only force protection considerations, what is best..." Finally, I hope I see the "correct" answers at the end, if not, would like to know where I could just for my amusement.
Those involved in CEC work have fairly extensive experience with the concepts/principals over the last 3-4 yrs; CEO and Maint Engineers get less experience. Thus, my proposal above. Not sure if those working toward facility engineer qual are getting this as part of the curriculum.
Require Civil Engineers to complete ATP Level II training in addition to the COE Security Engineering Course
my home station training has been sufficient... don't believe we need "increased" training
good survey. a few of the questions were worded so vaguely that I didn't see a clear answer. But it definitely reminded me of what i do not know!
Survey was pretty poorly written. For example question about mitigating flying glass (I believe # 3)...all options will reduce flying glass, 3 because the glass has been removed (answers a, b, d) and 1 because the Mylar will hold the glass fragments together. Similar problems with questions about bomb effects on facilities. Where is the bomb, what is the facility made of, etc. If it is a glass and steel structure, most injuries will likely be due to flying debris (a concrete and steel windowless structure will have different issues). Location of mission critical facilities question: what mission critical facility are we discussing (if it is the control tower you want it near the flightline, if it is the fire station responsible for the billeting facilities, you want it near billeting). I think it is highly unlikely that you will produce worthwhile datum from this survey as written.
Having served as a CENTAF engineer and addressing this on a daily basis, I feel there is room for improvement. The SF community and commandres need to understand clearly what the threat is and what level of protection is required. It has been a more fierce battle trying convince the SF community that the design is contingent on the threat level, capability, means, and desired level of protection. If they want everything to survivie an attack, it should be buried under ground in concrete. Maj A.C. Stafford
"brush up" training and knowing where to get additional info is essential. AFCESA is not very visible in this regard--need to bring their products to the CE squadron level (road trips?).

AF FP protection programs are less than effective because they only emphasize risk avoidance. The commander is often limited by this, when really a ORM approach should be applied to balance risk-to-cost or risk-to-mission degradation.
It's been a long time since I, personally, have had to apply FP knowledge. So my answers may not be as correct as I think. However, when I needed the info, I was able to find it with the help of MAJCOM and peers. Also, if this is an AFIT/ENV student, please tell Dr Bleckman, et al, that Saroya says hi!
In country, best to eliminate all windows by taking them out and replacing with plywood and sandbags in the cavity.
Get leadership to understand FP measures are not always going to be pretty. It appears they care more about how nice something looks vs how well it performs.
CE as a technical field of knowledge needs to better disseminate the technical knowledge. A consolidated library with the tri-service and DoD body of knowledge would be useful. Many DoD agencies (DTRA, TSWG, etc) have publications and other government agencies's (DoS, DHS, CIA, etc) publication should be shared.
Fine survey. Would recommend more on where people go for info today, what issues were challenges to them, degree of consensus on issues (or not)
I've not been deployed for about 10 years, pre-9/11 and Khobar towers bombing. So, force protection wasn't at the forefront when I deployed last. Although I'm EOD qualified, I haven't had the training on facilities damage effects to the extent covered on this survey. So, my personal responses (and knowledge) may not match that of most engineers who've deployed and received more detailed training.
When I deployed last year I had not been assigned to an active duty CE squadron in 12 years and knew almost nothing about ATPF. A 2-hour briefing in the field, along with copies of guidance docs, provided a wealth of knowledge.
The Penn State Course I took was a good class. Included a bunch of homework and exposure to some of the computer programs available to predict blast radius
This should be home station based training with a train the trainer concept sponsored by Wing AT/FP office and lead CE rep as most conflicts on guidance occur because of misunderstanding/misapplication of good "AT/FP" ideas that are not vetted or grounded by sound engineering problem solving.
This survey tested my "on the spot" knowledge & memory, which is poor. That fact is why the AF has created the pocket guides! Those manuals would contain this information, and in a deployment situation I would use those manuals and some good SNCOs to make sure I did the job right, but this survey doesn't really allow for that type of answer. Just venting -- thanks for listening.
I learned some during the initial phases of FP design standards...but haven't had to use them since. I think recurring discussion via CE and other engineering and educational mediums may help keep the knowledge a little fresher in our heads. E-mail is a great way to disseminate info...why not use it to disseminate info on a regular basis for educational purposes? Using the web is also available...I understand there's a AF Knowledge Now website...just gotta find the time to tap into it. This is where increased home station training (and focus from the boss) can make training time available.

Take the FP out of the hands of the SFS and give it to CE. Or since that is not likely - educate the SFS members, overwhelm them with details, designs, analysis (lots of math) to the point they know they are not the experts and otherwise get them in the mind set that they can and should defer to CE on details of FP. What the SF need to do is recognize a bad situation, champion that something needs to be done to correct it to senior installation leadership and then step back and let CE fix it. I am tired of bad ideas gone overboard because some SFS SNCO was appointed the "reinstallation security officer" and we spend months/years trying to correct bad ideas.

Many of the questions were not detailed enough to give a correct response and the answers were largely based on the readers assumptions rather than a true test of his or her knowledge on FP

I used to be the AT/FP rep for my unit a LOOOOOOOONG time ago, but I think a lot has changed since then.

Our two biggest challenges with regards to preparing young civil engineers to tackle force protection are (1) lack of support from senior installation leaders who do NOT have a thorough understanding of force protection principles and the distinction between MITIGATION and ELIMINATION of ATFP risks/threats and (2) the constantly changing opinions/doctrine within the Air Force CE community on the right way to resolve force protection shortfalls. Khobar Towers is a good case study for both of the points I raise. Additionally, most civil engineers have experienced first-hand the emotional climate which drove sweeping efforts towards cosmetic ATFP solutions such as mylar coatings, bollards, and jersey barriers, etc. We have been too prone to "knee-jerk" reactions to engineering solutions for force protection threats. As a result, there is a tremendous inconsistency and lack of true understanding within both the Air Force engineering community and the top leadership. I agree that all of us (Engineers) need to be reeducated, but so does "Senior Leadership", otherwise we'll deploy to forward operating bases in Iraq with Air Force leaders who refuse to accept the ATFP solutions their civil engineers provide them.

As stated above, use of case studies and installations in a real-world environment would be helpful. No matter what the "book" solution is, installation in a real situation will be dependent on many factors. We also must remember that force protection is protecting people, not so much protecting resources.

I think AF CE needs to update/improve its FP Engineering Handbook with current information//relevant web links, etc. Start an AFIT course to teach more detailed FP Engineer curriculum, benefits to military and civilian CEs.

Captain

The AF is the service branch leader in deployed major facility construction but I believe we lag behind the other services in designing and constructing expeditionary structures well-hardened against attack.

In my experience, at base level the FP issues have always been assigned to an individual to work with the CC, and everybody else went on with their day to day jobs. As a result, many of the lessons are not passed on. During my deployment and during Red Horse training, I did more hands-on stuff, but likewise the cross-flow of information did not occur. Only in talking with my coworkers have we gotten into useful details like why you need a bar attached to the structure to go with your Mylar window films, how blast waves will deflect over and come back down past the barriers, etc.
Believe a specified class should be required for all officers, as well as continuing education on new technologies or proven techniques at various career stages versus one trained FP engineer for each base
I don't think there is ONE best way to solve the knowledge shortage. It has to be a combination of COE, AFIT and home station training for CE officers and some sort of orientation on CE related FP issues for MSG/WG commanders. Before classes get offered a curriculum needs to be established so all CE officers have the same knowledge (mandatory training maybe?). The key to FP buy in on CE issues is selling the CE point of view to the leadership. It doesn't do the CE commander any good to have all possible CE related FP knowledge if the MSG and/or Wing CC don't understand why the CE commander is making the decisions being made. They have to be educated as part of this process.
Good luck with your thesis...
Suck it, Richards!
The Air Force had a great program with the Army, called "Air Warrior". That was the most realistic training that I have had in 9 years. Silver Flag doesn't even come close yet we mandate that training annually to play with those pieces of equipment we don't have at home station. Wrong idea. Need to focus on contingency training with an OPFOR similar to our sister services. Every deployment I have been on we are faced with unique challenges of that deployment yet we have never used anything from the formal training at Silver Flag other than putting up tents. Need to refocus our training to combine CE, SVS, SFS, Contracting, Personnel, Medics to a forward location. Need to stop stove piping.
The correct answer to 8 above is probably a combination of a-d. I do believe an AFIT class dedicated to ATFP would make the biggest impact. However, simply getting the message out that courses like the CoE course are available would help tremendously. This is the first I've heard of any external training.
I didn't understand the wording of question #3 so I didn't answer it.
Why is the AFH 10-222v3 FOUO? No wonder nobody knows about FP concepts...you can't even download the product!!!
What did I get on the test?
This survey included many vague and conditional questions. Not sure if it was designed that way or not, or what the ultimate goal of the survey is, but I imagine (based on the level of experience your respondents may have as they continue to return from tours in Iraq) there will be a number of folks who answer some of these questions with a "but..." in their minds.

Not enough coord at MAJCOM levels between the SFS/FP community and CE. Better policy making in the form interpreting the standards would make our lives a lot easier. I don't mean the MAJCOMs should get into the details and figure everything out for us, but the broader implications of some of the dumb things mandated by HHQ OPODS (especially when those HHQ units are run by the Army) force us into untenable situations where we can't realistically implement the FP rules.
I feel several questions, including number 3, were worded poorly and were ambiguous. Also, a better distinction needs to be made between the effects of blast, primary frag, or the overall detonation.
Over the past three years we have sent Capt's, 1Lt's, and 2Lt's to place where they were required to make engineering judgements about site layouts, existing facility mitigation etc without the proper training. Certain folks get to attend the Security Engineering course, but everyone that we have deployed.
Reference Item 8: I think all choices are important. It's hard to decide which is the most important.
Next time--tell me how I scored on the questions throughout the test so as to tell me whether or not I need more study in FP.
Deployed 3 times; every time I had to address AT/FP issues. Each tour had increasing awareness of what tools are available to assist. Saw otehr service initiative to provide overhead cover to all billeting trailers (above CENTCOM standard), while other trailers on base did not even meet minimum AT/FP requirements. Engineers will need to understand and be advocate for reasonable risk mitigation - not elimination - in fiscally constrained environment.
I think you have to be careful about what you emphasize when it comes to force protection. Everyone know that when FPCON gets high enough, you remove vehicles from 25m around the buildings. However, this then clears a path for terrorists to drive right up to your facility. More thought needs to go into these types of actions. If removing cars from that 25m perimeter is only half of the force protection equation, then we must also go through the rest of the exercise (like putting barriers in their place, or at least making a reasonable effort to simulate it if resources don't permit that.)
The best way to increase force protection is to provide the training to the decision makers, not necessarily always the engineers. The engineer may know exactly what to do but the decision maker may not care or put it at a high enough priority. It is the job of the engineer to take into account force protection, but it is not the engineer solely that should be responsible for being aware of the requirement. The engineer however should have the training necessary to implement the plan once all the players have buy-in.
Can't evaulate the Combat Skill Training, but I'm hoping it will cover most of what you just laid out in this survey. I head to CST in May and off for 2nd deployment to Iraq this summer. Good luck on your thesis!
Would be nice to know our score on the assessment.

Much of force protection and blast mitigation is situational. Your questionnaire is quite subjective and perhaps not the best tool for determining knowledge level. One question that exemplifies this is ~"T/F existing facilities are preferable to Temper tents." Are we talking about a soviet built reinforced concrete facility or a 3 story mudbrick Iraqi hut??? Are we worried about pre-sighted standoff weapons??? Another example 10-222V1 contains information on Bare Base construction and layout... it also covers hardening etc... Knowing all that I still could answer your question either way. Any milar on window questions should have referenced catch-bars or draps. With out those all you have is a large glass sabot careening through a room! Now that I've been grumpy... I think your hearts are in the right spot, we all need more training or a great reference guide close at hand when tackling these tasks.

Dusty isn't graduating on time.

One of the resources that we don't have at many AF installations is space. We don't have the space to provide sufficient standoff. Further, AT Officers and SFS seem to be concerned about protecting forces inside the wire, but many vulnerabilities lie outside the fence line (power, sewer, water, fuels, rail lines, etc).

Many of the questions did not provide enough information for complete comprehension of the situations described...many time wall heights, widths, densities, types were not discussed, nor were the different types of explosives determined or explained. Additionally, force protection and expeditionary/expedient methods are often at odds, for example, in an expedient scenario you would want to establish a centralized power plant with all of your MEP generators, then as time and equipment allows, create a backup power plant, but for force protection it would be better to have a decentralized power plant.

I think the AF invests enough money into the FP program but base Architectural compatibility standards, available standoff distance and commander preference are often competing forces that drive up the cost of engineering solutions to FP requirements. It might be more effective to invest in "hardening" the perimeters of our installations first and then concern ourselves with individual facilities within the perimeter. If the bomb doesn't make its way on base, it's no threat to base facilities.

Unfortunately all of these Force Protection questions are subjective to the situation. What is good in one location it is not good in another.

You should include for each question the optional answer "I don't know."

Most courses provide principles of FP, but little that is "actionable". It seems reasonable to provide very specific, how-to solutions to common tasks. For example, best way to provide protection for a command post, ECP or vehicle search area in a deployed environment to SWA. It would be nice to have text book solutions for these common problems as a starting point.

Most of the design engineers in the Engineering Flight are civilians. We have to focus on getting them to FP training as well...not just our military folks. They are the ones that oversee or actually do the design of our permanent structures at permanent bases. Of course, military folks definitely need training for deployed environments, but we can't forget our civilians as well.

Commanders are too concerned about base appearance rather than allowing us to gain FP knowlegde and then implement it.
training in the classroom is overrated; most people learn things when they're thrown into it, especially in a deployed environment
I thought I knew a decent amount about force protection before I took this survey. Officers are taught about blast vs frag and standoff distances at 101, but I don't recall any specific information about using hesco barriers vs sandbags vs concrete barriers for protection. We need tools to be able to conduct home station training on this, and I do not know of any. All force protection training seems to be personal anti-terrorism protection (personal security) type of training.
AFIT is a joke because the instructors aren't real professors or teachers. They're just filling an assignment so they can go on to USAFE or PACAF. The AF should hire real professionals to teach the material. Home station training is a joke because no one on home station has a clue, and they'll never make time for it. It's not like we actually do Prime BEEF training. Hands on training is good, but it would need to be incorporated with lessons.
We have been extremely poor at placing engineers into integrated force protection teams with SF. Often SF ends up out on a limb without the proper engineering expertise available to them.
Are we going to be contract engineers or combat engineers? The answer should cause a shift in the current business practices of AF civil engineers.
This questionnaire is way too general to provide very valuable info - many of the questions could be answered in several ways depending on the situation, and the situation was not fully fleshed out. It was also not clear on many questions if you were referring to home-station situation or deployed, both could prompt different responses.
Please send out answers with summaries to each question...because we're looking for immediate knowledge that equates to immediate results and lives saved. Not more classes.
I felt some of the questions in the primary survey needed more information to better portray the situation. For example you asked if a taller perimeter wall would provided better blast protection. But information left out was if the wall was of adequate strength to withstand the blast, what protection was sought after (overpressure vs primary frag), distance of protected facilities from the wall, etc.
A guide must be developed on expedient construction methods for force protection alternatives. These guides should have templates with statements of work with different accomplishment methods like troop labor or local contractor (they should be general and not too specific). Available manuals aren't easy to use or obsolete for our current mission. Maybe having a 24/7 operating cell that we can contact when we deploy to provide technical expertise when required.
Standoff distance is one of the best things for force protection. However nothing is done to acquire more land for a base. AT/FP requirements mean more money to reinforce buildings or more land for standoff, but there is no support for either. Yet leadership still expects to meet the AT/FP requirements. But with no money or land, AT/FP will be bypassed, ignored, or waived.

There's a definite inertia associated with the incorporation of ATFP requirements (particularly in non-expedient environments at existing bases). At times, the requirements seem to be seen as an annoyance that is hoped will go away b/c they often conflict with other functionally important requirements: parking, drop-off/pick-up area for kids, and general access. The rules often look good on paper but when they're brought into the real human world, they're often so painful to incorporate that they get ignored or only partially complied with. Not sure what to do about it, but thought you might like to hear some observations from Aviano.
The SF career field needs to be plugged into the engineering issues for Force Protection (and visa versa) to prevent Jersey Barrier City from becoming the norm overseas and at CONUS installations.
What are the answers to the questionnaire?
Several of the questions in this survey were very ambiguous. Examples: "What is the best way to deal with doors in occupied facilities?" and "Are inhabited buildings preferable to temper tents?" The answers to both seem entirely situation and threat dependant. There are many other considerations beyond force protection when deciding to use or not use local facilities vs. temper tents. I don't believe there is "one right answer". That being said, my experience is that there are very few "canned solutions" in the field. Understanding the basics of the threat, the mission, and the resources available all contribute to developing an effective Force Protection strategy at a deployed location.
Many of the survey questions were not worded well. Having been deployed many questions can be taken out of context or are written too vague.
I was in Kuwait and was tasked to help OSI do several FP Vulnerability studies at major hotels (where our pilots stayed) around the country. I didn't have any training on it and found that my best resource was surfing the internet. I had one classified document that covered facility standards, but it would have been nice to have a resource on the net that I could have referenced....maybe there is and I just don't know about it.
One reason I'm choosing to separate is because I do not feel as though I'm adequately trained to deploy to a bare base as a senior captain and do my job. (the other reasons are family reasons)
Based on my experience deploying with the Army to augment CJTF7 in Baghdad, as AF Civil Engineers we understand and know more about AT/FP requirements and mitigation than our Army counterparts.
The COE security Engineering course was the best training I have had concerning force protection. I found the most difficulty with implementing force protection applications was base commander's lack of confidence in the civil Engineers and the Security Forces' failure to appropriately apply force protection concepts. (They would spend ridiculous amounts of money on fancy gadgets like cameras but ignore things like standoff and obscuration principles...)

When it comes to implimenting AT/FP criteria, more emphasis should be placed on determining the highest threats versus implimenting general (and usually too many) AT/FP criteria. Also, consideration must be made to a base's perimeter defense, surroundings, climate & environment and history of attack (since it's activation, how many times has Minot been attacked? versus Baghdad International?)
Send more engineers to training than SFS. AT/FP cells mistakenly think they are engineers.
On question 9, a 5000lb bomb will take out most things. Several of the questions are rather vague with several possible answers.

First Lieutenant
How did I do on the test? Maybe give me my score at the end. Not to specific answers put for example 15 out of 30 correct.
Real World is the best training you can recieve.
At a previous assignment I was the wing ATO. In the course of this job I received a great deal of AT/FP training. While some of the training was specific to the job of ATO, most if the training helps me day to day with AT/FP issues that come up around the base. It would certainly help most CE officers to have AT level II training as well as attending a security engineering course. This way, not only will the engineers be able solve AT/FP issues competently, they will be able to "talk smart" with the wing ATO and SF, ensuring the best bang for the buck while mitigating vulnerabilities.
AFIT should develop a new satillite course for CE officers that is focused on Force Protection
It seems as though there is not a centralized source of knowledge that can help answer questions, provide training, work through problems, etc. I work with AT on an almost daily basis, and often times the construction aspect of FP is a mouse chase. Plus, no one here has received adequate training necessary for FP design. We cannot do weapons effect calculations on smaller projects unless we were to outsource it. It would be better to make Force Protection knowledge organic to the basic CE Engineer.
The CoE course was excellent. This class gave me more information on Force protection than anything the Air Force currently offers. I would recommend (and have in the past) inviting the Corps out to MGT 101 and spend a week going over FP issues. It is not uncommon for brand new Lt's to get deployed out of their first assignment (I have seen it at RED HORSE and Base Level). Any training the Air Force is doing now is woefully inadequate.
Some of the questions are extremely vague; openly written. Standoff distance, materials and funds are the biggest limiting factors in that order.
Decent quiz. A couple comments... 3. Didn't understand. 4. Any material that isn't glass will eliminate the threat of flying glass. 8. "Effective?" 26. Didn't understand. 35. "Better?" Is this asking about overpressure?
Many of the questions in this survey omitted key considerations or had multiple correct answers. As an example, three of the four answers to question four remove the glass

from the equation, thus meeting the requirement of the question.
Wow, is Lt Richards going to finish by March 21st?
Would prefer an AT/FP specific course (not run by AFIT). It should be ~5 days in length to provide comprehensive study.
The proper knowledge is out there, and a lot of civil engineers are learning and understanding it. The problem is that we civil engineers have a hard time convincing higher leadership at our installations which means are effective and which aren't. Specifically, when I was deployed, we were forced to build a "blast wall" of concrete and stone around the command post that provided little to no protection. However, it provided psychological protection, and the commanders were more interested in "feeling" secure than in actually being secure. Really, we need to start educating our group and wing commanders in force protection concepts more along with our new engineers.
In my experience, FP (specifically the Wing AT Office) is an SF function. The ATOs I have dealt with demand strict compliance with their directives without question. For the most part, these are mid-level SF NCOs with no engineering experience, and little desire to be cost effective. They do not want to examine options and engineer solutions. They find a product that they think will get them a good EPR bullet and bully whatever young CE CGO they can find into pushing/programming it.
In the CoE ATFP engineering course, I think they focused primarily on permanent facilities, which is useful when programming or designing construction or modification to buildings on a permanent installation, but has limited application in more austere environments. I don't recall MGT 101 covering the subject of ATFP much. Maybe the focus of training has changed since the onset of OIF, but my experience was showing up in Baghdad not knowing but quickly learning what Hesco barriers were, their effectiveness and ease of teardown. I also saw numerous other types of barriers... pretty much everything except the revetments we learned about at 101. Overall, the training I'd received prior to deployment taught me very useful fundamental concepts but left me unknowledgable about some specifics such as materials. Other things: I don't recall going over visibility reduction when covering ATFP.. when any TCN could be an insurgent sympathizer, the need to reduce the visibility of an installation, i.e. eliminate or block openings in perimeter walls that allow the visibility of the installation and day to day operations, was considered important in my experience. It would have been nice to know a little about what SFS needs for force protection, specifically in my mind was their vehicle search procedures and need for a search pit. One issue I ran into which I never got a good answer for was what risk is posed by a direct mortar/rocket hit to a fuel truck... Would it simply burn (like a fuel bladder) or is there a risk of detonation as a enclosed container with a fuel/air mixture? Perhaps it goes beyond the scope of this survey, but personnel need training and reminders. Some of my troops needed to learn how to respond to mortar/rocket attacks (get down and stay there through alarm black), learn to not discuss impact locations in unsecure areas where unfriendly ears might hear and get an idea of how to adjust their aim, and to stress the importance of personnel

accountability following an attack. Maybe its a PACAF thing (my only home base experiences), but it seems odd that we train over and over again how to respond to chem and scud attacks but the troops are vague on what to do when a mortar/rocket attacks interrupts the middle of their day.

Many of the questions did not provide enough information to ensure a clear choice. For instance: #15 “ “œOccupying/inhabiting existing facilities is preferable to erecting TEMPER tents?â -- The correct answer could easily be yes or no depending on the circumstances (were the facilities built by a 3rd world country and 50 years ago? or were they built by the Japanese three 3 years ago....(i.e. are the utilities in good order). This lack of clarification renders the results of the survey moot. Another example: #24 â “ â œIn a multistory building what causes the most casualties from a large vehicle bomb?â -- By definition an aircraft is a vehicle. Therefore clearly building collapse causes the most casualties (9-11). On the flip side this is not the answer that you are looking for...after all, Khobar towers did not fall down. These are only a couple of examples of many issues that I have with these questions. I recommend further clarification of the questions in the future, especially if the resultant data will be applied to any kind of evaluation/decision making.

I would like to see more emphasis on deployment specific training while at home station. I feel like we (as CE career field) spend the majority of our time doing the home front mission of engineering/programming etc. and not enough time practicing/maintaining an adequate level of knowledge for deployment critical/specific tasks (beddown, ATP requirements, etc.)

When deployed I was responsible for a lot of force construction projects, but often had to defer to SFS personnel for decisions because of their familiarity with their own force protection regs. However, often times the SFS mentality is to spend all your resources on stopping imaginary/percieved threats that may never materialize. I think the AF needs to do a better job at studying cost vs. benefit of different levels of force protection at different bases in the AOR. This information then needs to be translated into our CE series of AFIs. Also I think there needs to be better availability of force protection instruction to junior officers while at home station. I have seen only limited junior officers have the oppurtunity to attend this sort of training. Often times the engineering flight will only send one or two officers to the training in order to be the resident "FP-guy." This may save training \$\$\$ to the flight, but it puts many of our engineering officers at a disadvantage when they reach the AOR.

Standoff distance was the biggest protection from bombs that I've been taught and when I deployed the base had miles of standoff distance.

There were a lot of questions that seemed to be of the "pick the best answer" variety. I'm not sure how accurate those will be in really determining what someone's level of knowledge is. With FP there are a TON of variables to analyze before being able to pick the best course of action. I feel very comfortable and have some practical experience with quite of few different FP applications though I don't know if that will neccasarily be reflected with my score of this assessment. My two cents though...
More classes need to be offered to more people. ATFP money should not only be dumped into projects but also into training. More people than just the ATFP engineers or cops need the training. The ATFP engineering is not the only person who will deploy so all people who will depoly need this info... meaning everyone. If ATFP is going to be the new way of doing business/design standards/mindset we should start developing that with mas education, not just a handfull of peopl on base who are so-called experts.
There definitely is a deficiency in Force Protection application by CE. Everyone identifies the problems but only CE can provide the solution. I learned most of my training by talking to experts, including a blast/structural engineer while in Iraq. The best training is getting those experts out and talking. The basics of bombs (frag & overpressure) need to be reinforced across the board. I gained a lot of respect instantly after a real world car bombing of a facility since I was able to understand the basic FP needs. One thing definitely missing is cabling barriers together.
The questions on this survey would have made more sense if they were broken out into home station issues and contingency issues.
No one takes FP seriously here in the US until something happens which is usually to late is should be something we know with out having to look at some books for details it should be 2nd nature to us Civil Engineers...
If you want to have effective force protection in the desert, you need to designate an officer as the force protection guy. He needs to have the credibility to implement effective (read: not wasteful) FP solutions without interfearence from all the Colonels running around.
The survey only gives 3 options which are usually not the three available in the field. Write in answers might be better
Force Protection at home station is something that shouldn't neccesarilly be stressed to CE personnel only-->It needs to be stressed to the base leadership. I can't remember how many times after 9/11 I would ask myself, "Do you want Force Protection, or do you want things to look nice?".

Second Lieutenant

I forgot that I have received the Army CoE Security Engineering Course, but I did not memorize all the information given. I do have all written information available for reference.
I have been in the career field for 18 months now. I have never been deployed but I though I had a decent understanding of FP measures. After taking this survey, it is making me reevaluate how much I really know.

Sometimes AT/FP isn't taken seriously. Funding restraints have caused us to change design or to incorporate AT/FP issues at a later time.
have multiple people trained in the squadron as Force protection people and have them teach as part of rediness training day
From my one deployment experience, in my opininion, the ATFP office under the Wing was basically worthless and caused CE more work and time than generating any semblance of a productive or practical result. I would suggest that any ATFP issues and solutions dealing with land, buildings, or infrastruclue be authorized and approved by the Engineering flight in CES of that particular installation.
I did learn a lot from MGT 101, but that was a while ago, a refresher and some recent lessons learned would be nice every now and then.
This survey is an excellent sourse to study where we are with force protection in the AF Civil Engineer career field. It shows initiative on behalf of AFIT.
20 min to take this survey was very misleading!
I love these surveys. They break up the monotony of the day. Thanks!
Why don't you give us the answers to the questions?
More emphasis on protection would help. Yearly training and more case studies.

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Vita

Lieutenant Dustin C. Richards graduated from East Alton-Wood River Community High School in Wood River, Illinois in 1997. He completed his undergraduate work at Rose Hulman Institute of Technology and was awarded a Bachelor of Science degree in Civil Engineering in 2001. At that time he was also commissioned into the Air Force as a second lieutenant.

His first assignment was in the 27th Civil Engineer Squadron at Cannon AFB. During his time in New Mexico he worked in the SABER office and handled the duties of engineering deputy flight commander. He deployed in support of Operation Enduring Freedom in 2002 and was a part of the buildup and execution of Operation Iraqi Freedom in 2003. Upon his return from deployment he left Cannon to begin graduate work at the Air Force Institute of Technology.

Upon graduation, Lt Richards will move on to his next assignment as a base level engineer at RAF Lakenheath.

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